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SKYWAYS

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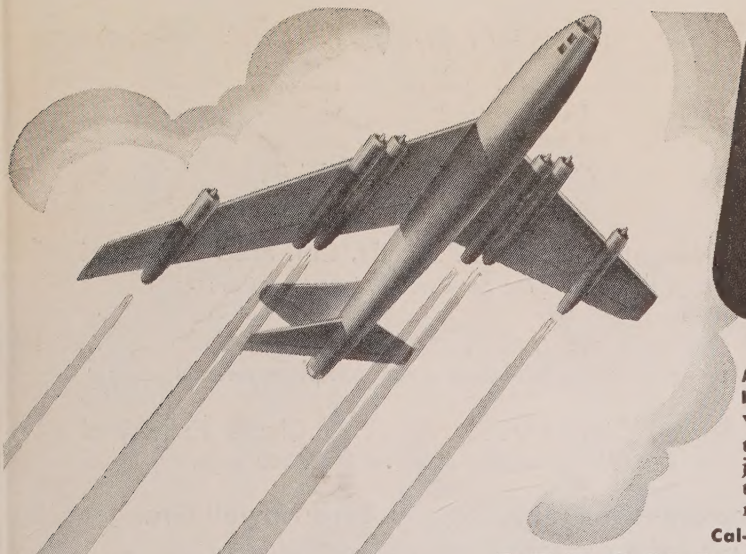

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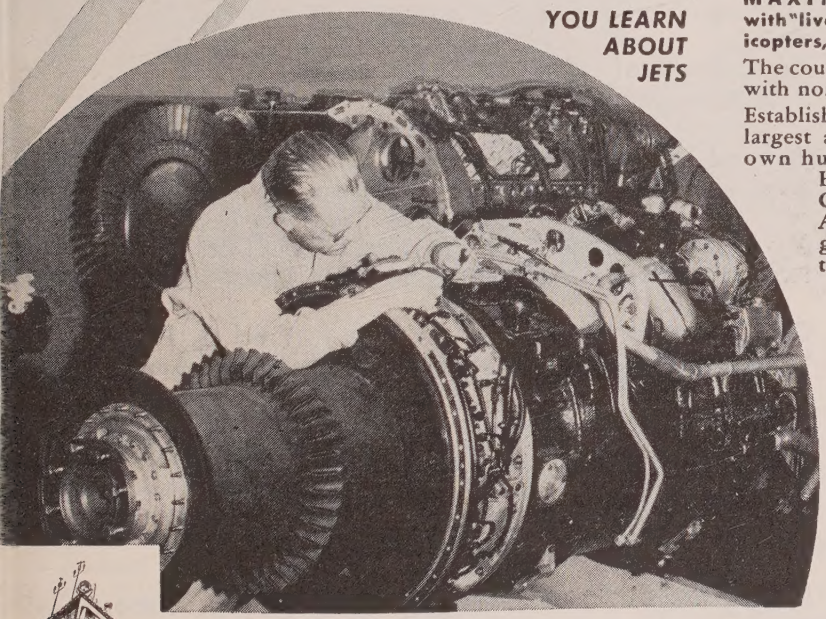

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SKYWAYS

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D. N. AHNSTROM . . . Managing Editor STANLEY M. COOK . . Production Manager
CHARLES W. ADAMS . . . . Art Director A. E. CARDWELL . Subs. Circulation Mgr.

JANUARY 1949 **VOLUME 8, NUMBER 1**

The Henry Publishing Company publishes SKYWAYS at 444 Madison Avenue, New York 22, New York. Advertising Offices: 444 Madison Avenue, New York 22, N. Y.; 6 N. Michigan Ave., Chicago 2, Ill.; 816 W. 5th Street, Los Angeles 13, Calif. Gordon Simpson, West Coast Manager. James L. Cunningham, Chicago Manager.

The following publications are combined with SKYWAYS: Air News and Flying Sportsman.

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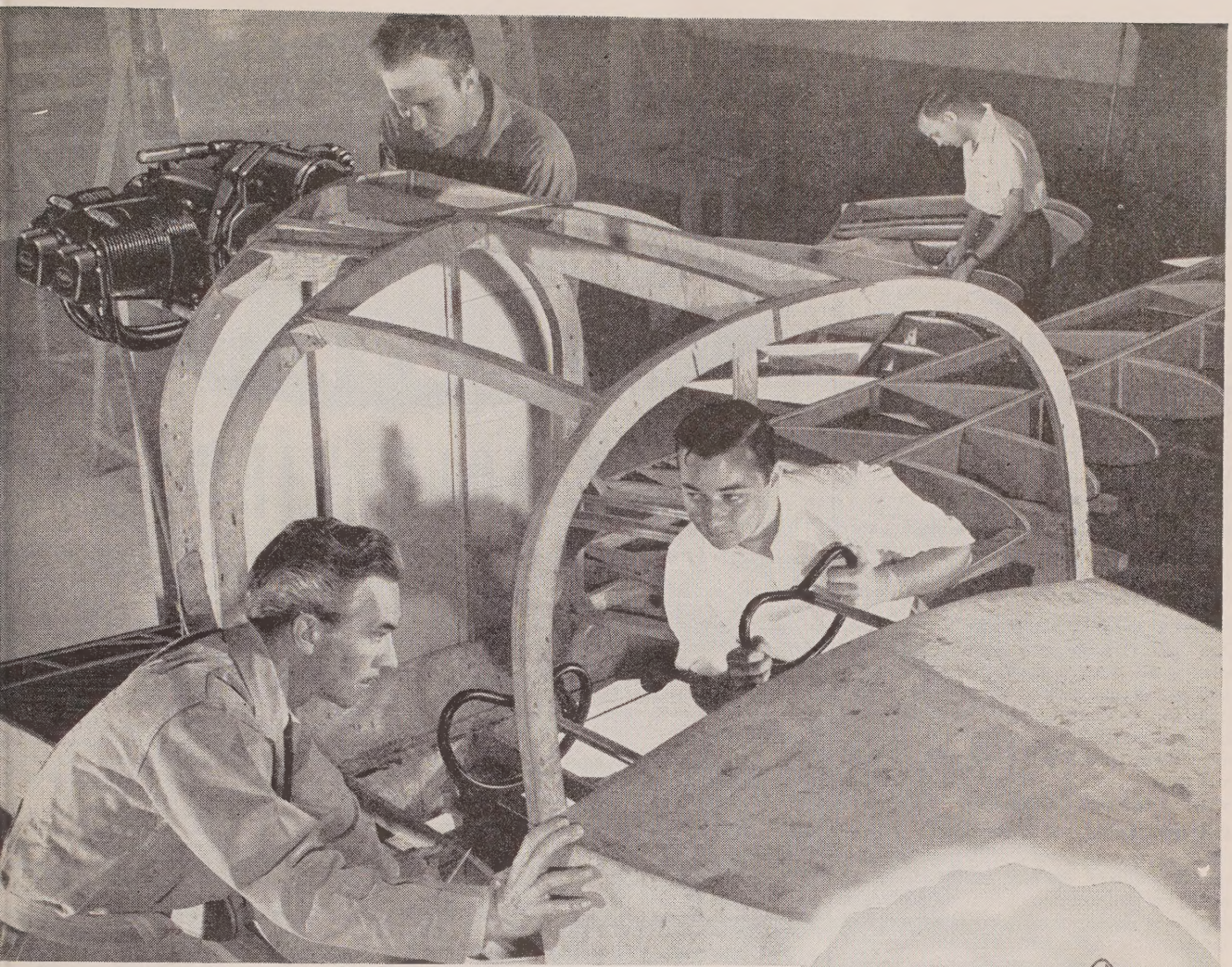
Spanish Edition: Adolfo Guido Lavalle, Editor-Director, Suipacha 419, Buenos Aires, Argentina.



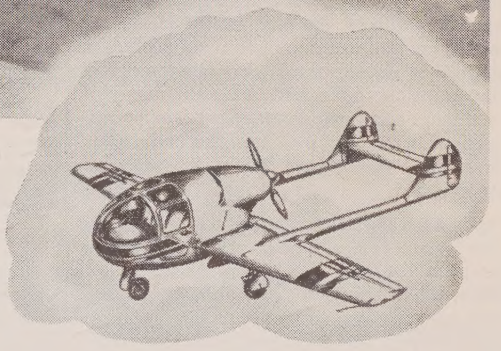
MOCK-UP FOR TWO FUTURES

This full-size wooden model of an airplane is taking shape under the hands of Northrop engineering students. When completed, the mock-up will be an exact likeness of an unusual new type of plane that may help mold the future of private flying. As a means of practical training in Aeronautical Engineering it helps mold the futures of hundreds of young men.

This mock-up is part of a typical Northrop training project. Students designed the airplane, prepared the working drawings, built the mock-up to check on their design, dimensions and specifications. They will make all the usual engineering tests, do all the production planning . . . in just the same way, with the same thoroughness, as engineers in an actual aircraft engineering department.

This practical training is preparing Northrop students to join the ranks of Aeronautical Engineers now designing the vast future of Aviation. Northrop graduates are stepping directly into design, research, testing, aerodynamics, and power plant engineering . . . some are in such advanced work as helicopter and guided missile design.

Northrop students know there is a big future in Aviation . . . and that their best bet is a career in Aeronautical Engineering. It takes them only two short years to get ready. Perhaps you would like the details.



The Airplane in the Making

Northrop aeronautical engineering students combined their ideas for the ideal private plane. A twin-boom pusher type, the propeller is placed between the two booms for safety from the whirling blades. The cabin arrangement permits pilot and passenger to step into the plane as easily as entering an auto. Another typical student project is design and construction of an all-wing glider.

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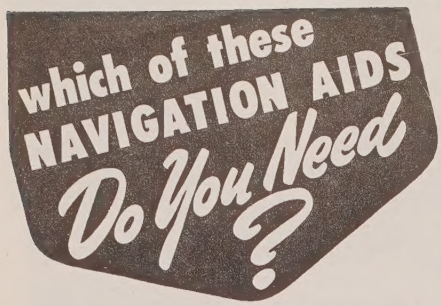

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IN SKYWAYS

February Issue

Sonic-Speed Midgets

Wings have been added to the wind tunnel. Today, NACA and the USAF put exact scale models of planes, missiles and rockets in actual flight to learn specifiic performance details.

AIR YOUR VIEWS

Field Size

Gentlemen:

I wonder if you could tell me how long an air strip I would have to have to clear 30-foot trees at both ends of a field at an altitude of 8,500 feet? I think I could get a strip 1,500 feet long and 75 feet wide. Would that be enough for the average personal airplane?

LLOYD A. JOHNSON

Morrison, Colorado

Judging from the air strips being used by flying farmers out in your section of the U.S., we'd say "definitely no" to your query regarding a strip 1500 feet long and 75 feet wide. Those Colorado air strips that are located at elevations of 8,000 feet are all at least 2100 long and 100 feet wide. If you are thinking of buying a lightplane to use "at home", i.e. to land and take-off from your own property, might we suggest that you contact the National Flying Farmers Association at Stillwater, Oklahoma, for detailed information regarding size of strip that would be safe for plane operations at an elevation of 8,500 feet.—ED.

•

Shoulder Harness

Gentlemen:

I read John Jefferson's article "Shoulder Harness . . . A Must" with a great deal of interest because it brought to mind a vivid example of how a simple set-up like a shoulder harness can mean the difference between life and death in an airplane crash.

During World War II when I was flying with the 443rd Fighter Squadron of the 475th Fighter Group, it was my unfortunate experience, along with several other fighter pilots and bomber crews, to get caught in the weather while on a mission to Hollandia from the Markham Valley in New Guinea. Another unfortunate that day was Lt. C. C. Wire of my outfit.

Wire's Wingman, Lt. Ross, developed trouble with his P-38 about three-quarters of the way to the target, and turned back. Wire also turned back to make sure Ross got to home base safely. When the two of them reached a point where the entrance to the valley should have been, they were confronted with weather that reached from the deck to at least 30,000 feet. Later on, every plane on that mission hit the same front.

Wire led Ross out to the Bismark Sea, figuring their best chance was to slide into Saidor on the coast. When they hit the coastline, however, rain forced them down on the beach at tree-top level. Ross and Wire became separated and each set out on his own.

Wire followed the coastline, spotted an L-5 strip above Bogajim and tried to circle back to it. However he lost sight of it in the rain, had to head back out to sea again, then finally angled back toward Saidor.

According to Wire's own account after it was all over, the first he knew he was too low was when he spotted waves above both wingtips. The '38 hit the water, tearing loose both belly tanks, which, in turn, struck the stabilizer and demolished all elevator control. Then the P-38 started back upstairs. In a few minutes, it nosed down and Wire said the last thing he noticed before the crash was the airspeed indicator which read 160 mph. The plane smashed into the water. Wire's shoulder harness held for that fraction of a second of impact, then broke. Wire's head snapped forward, breaking his nose on the gunsight. Wire was in a semi coma when his ship started for Davy Jones' locker, but the water revived him, he pulled himself away from the ship, got back to the surface of the sea and inflated his Mae West.

He was actually just a few yards off shore, and was picked up within a few minutes. After several weeks of emergency furlough in Sydney where his nose was restored to working order, Wire rejoined his outfit.

While it isn't my idea to suggest that CAB should pass a regulation forcing amateur pilots to wear a shoulder harness, why in the devil doesn't someone insist that pilots and passengers alike follow through on the ideas of the Crash Research Institute. One session with such reading material as "Shoulder Harness . . . A Must" should be enough to cause every thinking pilot to install a set of shoulder harnesses in his plane.

CARROLL ANDERSON

Stockton, Calif.

Thank YOU, Mr. Anderson. Your story as well as others have convinced us of the advisability of shoulder harness installations.—ED.

•

What Is It?

Gentlemen:

Am I a dummy or are there other readers who would like to know what kind of an airplane appears in the picture at the top of page 20 (October Issue)? It is a biplane of ancient vintage, but . . . what?

BILL SHIPLEY

Peever, S. Dak.

You're not a dummy, Bill. You're just younger than the airplane. Actually, it's an old Jenny powered by a Ranger engine and owned by well-known stunt pilot Sammy Mason. He flies it, in a manner not recommended for others, at air shows around the country.—ED.

•

Liaison Enlistment

Gentlemen:

For several months I've tried unsuccessfully to find out what branch of the service controls the recruiting for Liaison Squadrons. Can you help me?

I am a private pilot and would like to become attached to one of those groups.

DAVID R. MAPER

Arlington, Va.

We contacted the Air Force office for you, Mr. Naper, and learned that your best bet would be to get in touch with the Base Adjutant's office at either Langley Field, Andrews Field or Bolling Field. The Air Force has taken over much of the liaison work, and the Base Adjutant's office at any of those fields near you can tell you what your chances are of enlisting and being assigned to that Liaison branch of the service. —ED.

Pint-Size Plane Promotion

Gentlemen:

My hat's off to Colby for his article on "pint-size aerial putt-putts," and to SKYWAYS for publishing it. BUT . . . why don't you editors help out the designers and builders of high-performance planes by really breaking down and giving them a big send off?

I am thinking, in particular, of the Aero-Flight "Streak." If that plane will do 90% of what is claimed for performance, it is one of the greatest planes yet built.

C. C. BONIFIELD

Mattoon Airport
Mattoon, Ill.

•

Mexico Flying

Gentlemen:

May I give you the latest and most up to date facts about flying in Mexico? There were a few wrong statements in the CAA's "Terrain Flying," which you published in October.

First, the authority for the data in "Terrain Flying" was a man on the East Coast. I have done considerable flying on the West Coast of Mexico, send my students down there, and have sent hundreds of private plane pilots down there and to date there hasn't been a mishap. The terrain down the West Coast as far as Mazatlan and even down to Mexico City is no different from that in Arizona and other Western states.

The routes along this West Coast are over populated country, and one never needs to be far from a highway. I have never flown into violent mountain air currents, and the weather is seldom other than CAVU. Of course Mexico City has an elevation of 7,400 feet, but the popular cities on the West Coast are near sea level. Airplanes are so popular in this section of Mexico that I've never landed in a small town or village and had any problem of the natives tearing my plane up or walking into the prop.

I have never been dived on by buzzards. However, it is common sense to avoid such hazards. Here at my airport (Nogales International), we keep a supply of World Charts on hand for pilots flying into Mexico and, while I admit they are not too accurate, we have never had a report of a pilot getting badly lost. We have never had a report of or seen haziness that reduces visibility to less than 30 miles. Usually, we have a visibility of about 75 miles.

None of the routes to dozens of cities in Mexico takes one over any mountain peaks. As far as plane repairs are concerned, we supply most of the Mexican operators on the West Coast with parts, and they keep only a small supply. When a part is needed, we get it to the operator quickly, and little delay is caused the plane owner. Certainly no more of a delay than at many points in the U. S.

We sell cans of gasoline and like to do so, but we never take any with us. Frankly, we tell pilots they won't need it . . . and they don't. There are a number of airports in this section of Mexico with gasoline, and even Cubs have no trouble getting from one airport to another. So far, no letters have been necessary to get gasoline. You don't have to take a funnel or chamois with you if you fly in Mexico (at least through here) as they are used at every airport that I have been to or ever heard about. Tie-downs are no problem either.

Since Nogales is a designated airport for Mexico, we have an inspector of Aeronautica Civil de Mexico who makes out the flight plan. He takes care of this and there is no $4.12 fee, nor does the pilot have to send any wires or pay for any wires. This official, the Mexican Customs and Mexican Immigration officials are the only ones required to clear a plane into Mexico. They are not based at the airport, so if you fly in without advance notice, it may take an hour or so to locate them. But if we have had advance notice, they'll be at the field waiting. Absolutely nothing needs to be done about clearance before arriving here. The whole clearance is done in about 10 minutes for two people; perhaps 15 for four. This includes tourist cards, flight plan, Customs inspection of baggage and plane, and Mexican Immigration clearance. You are then in Mexico and there's no need to check in at any other Mexican Airport. A flat rate of $10 is charged for this service, and it covers everything.

The article "Terrain Flying" never even mentioned the one really serious problem we have here . . . the advance notice of arrival to the U. S. Officials. It is necessary that such notice be received by the U. S. Immigration Service, the U. S. Public Health, and the U. S. Plant Quarantine and the U. S. Customs Service at least one hour before landing from Mexico. If you don't notify the U. S., the fine is $500 for Customs and $500 for Immigration. The airplane is also tied up by U. S. Customs for several hours. Pilots entering Mexico at some other airport are not always advised of this, but this excuse is not acceptable to the U. S. officials. We have had returning pilots who have been unable to get telegrams through to the U. S. officials because telegrams are unusually slow, and there is only one long distance telephone line on the West Coast of Mexico. We here at Nogales try to assist pilots and if they can give us an approximate time of arrival on the return trip, we pass on advance notice of their arrival to the U. S. officials.

JACK EVANS

Nogales, Arizona
Port of Entry to Mexico

We've heard many swell reports of service at Nogales and do hereby recommend it as a Port of Entry for the private pilot who wants a flying vacation minus certain headaches.—ED.

•

Query Corner

Gentlemen:

Could you please give me the address of the Professional Race Pilots Association. I've been interested in the sort of flying Art Chester talks about in his article in your September issue.

S. YUHASZ

Buffalo, N. Y.

Write Art Chester and the Association at 2500 West 73rd St., Los Angeles, California.—ED.

Gentlemen:

Where can I get a three-view drawing of the Bell P-59?

ERIC HART

Milwaukee, Wis.

Try Bell Aircraft Corp., in Buffalo, N. Y.—ED.

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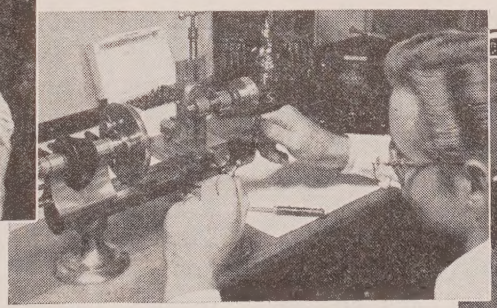

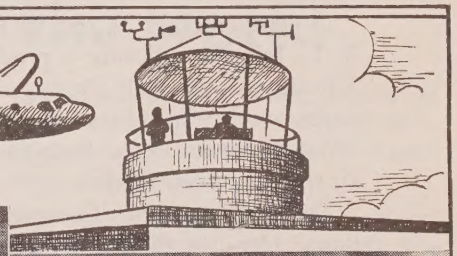

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USAF NEWS

THE YEAR 1948 was a big one for the U. S. Air Force. General Hoyt S. Vandenberg, when he succeeded General Carl Spaatz as chief of staff in April said: "The U. S. Air Force is on the way back to a competent fighting organization. It is not the biggest in the world today as it was during the war. But we are making the best possible air force out of what we have."

The USAF bore him out in many ways during the year. Probably the best-known achievement was Operation Vittles which developed into the biggest air-lift operation in history, far surpassing the "Hump" air supply record between India and China during the war. Secretary Symington announced that the X-1 had been flown faster than the speed of sound "many times," with Capt. Charles E. Yeager first to break the sonic barrier in October 1947.

In September, at Muroc Air Force Base, Major R. L. Johnson, piloting a production-line North American F-86, fully equipped for combat, set a new world's speed record of 670.981 mph, and admitted afterward he hadn't let out the throttle all the way even then.

The Strategic Air Command directed rotational training flights of Boeing B-29 groups between bases in the U. S., Alaska, Germany, and the Far East. The first Consolidated B-36 heavy bomb group was established at Carswell Air Force Base, Texas, relegating the B-29 to the medium bomber class. Sixteen F-80's under command of Lt. Col. Dave Schilling made a round-trip flight from Selfridge Air Force Base, Michigan, to Germany without a hitch, and an entire wing was transferred to Germany from Panama—first jet force to be based overseas.

Procurement orders were placed for 2,451 airplanes, including Boeing B-47 and North American B-45 jet bombers; F-86, Republic F-84, and improved Lockheed F-80 jet fighters; the Northrop B-49 Flying Wing eight-jet bomber, and the Fairchild C-119 and Douglas C-124 transports.

Experimental contracts were announced for the McDonnell XF-85, parasite fighter to be carried in the B-36's bomb bay; the McDonnell XF-88 and Northrop XF-89 twin-jet fighters; the Lockheed XF-90, Republic XF-91, and Consolidated XF-92, Douglas X-3, and Northrop X-4 research aircraft, designed to test the effect of speeds ranging from high subsonic to supersonic on various types of aircraft design.

That's a brief sketch of Air Force activity in 1948; 1949 should be even bigger.

By June 30 the Air Force will have organized 66 of its authorized 70 groups; it will reach a personnel strength of 446,500 officers and men, plus 15,000 one-year volunteers, and newer aircraft will become available in increasing numbers.

But organization of 66 groups by mid-year, and even 70 groups sometime before June 30, 1950, are still only yard markers on the way to the Air Force's goal of a fully modernized operational 70-group Air Force by 1952.

Today, though new orders have been placed, the Air Force is still 95 per cent equipped with planes used in World War II. A "modernized" air force requires replacement of the prop-driven F-47 and F-51 with fast jet fighters. Jet bombers must replace our Douglas B-26, and our main bomber force must be spearheaded by long-range bombers.

A lot of time elapses, too, between "organizing" a group and being satisfied that it is "operational." A group is considered "organized" when it has a reasonable complement of men and equipment, but it is not operational until it has all its necessary equipment and 100 per cent of its officers and men fully trained. This means not only air crews skilled in the most effective combat use of new aircraft, but ground crews trained and equipped to keep the planes in proper working order.

That is the goal. In 1949, the Air Force will continue its progress toward that goal by accelerated activity in many fields. To avoid mention of classified subjects, the program must necessarily be described in general terms.

Establishment of a strategic striking force is the primary objective, and will be each year until it becomes a fact. Work on atomic weapons and guided missiles will be intensified. The aircraft control and warning system will be im-

proved and expanded. Aviation engineer requirements are being increased, as are requirements for flying training, technical training, and indoctrination of new recruits. Air transport, communications, and weather activities will be stepped up. The Air Force also expects to take over more of its housekeeping functions from the Army in its progress toward complete autonomy. A better, more effective Air Force is on the way. But it still has a long way to go.

* * *

MARRIED men are now eligible for aviation cadet training, providing they meet other qualifications of age, physical conditions, and education. Before the war, and since aviation cadet training was reopened after the war, applicants had to be—and stay—single during training (except officers accepted for training in grade).

The newly announced policy change becomes effective for the March 1 aviation cadet class and is expected to interest many servicemen and veterans whose marriage made them ineligible until now. These other requirements still apply; age, 20 to 26½; physical condition, excellent; education, two years of college or demonstration of its educational equivalent by passing a written examination.

The March class will accept more than 1,500 applicants, as compared to about 1,300 last October. The quota for the 1949 fall class provides another comparable increase.

One important stipulation regarding married cadets is that their wives cannot accompany them to training bases. Cadets who violate this rule will be subject to dismissal. At least two good reasons exist for this rule: first, housing is critical in the vicinity of Air Force training bases; second, the course of training is stiff enough to require the cadet's undivided attention and leaves him with almost no spare time.

* * *

WITH a current strength of more than 30,000 men, the Air National Guard is conducting a nationwide recruiting campaign. The ANG'S goal is 40,000 men by January 1, 1949.

ONLY THE BEST CAN BE AVIATION CADETS

...and you get the best and most advanced pilot training in the world

The Air Force needs capable, ambitious young men who recognize a challenging opportunity and have what it takes to go get it.

If you can measure up to the high standards required for appointment as an Aviation Cadet, every phase of your $35,000 Aviation Cadet training is a steppingstone to a successful aviation career. You are trained carefully, thoroughly in each phase. And you are constantly in touch with the latest and most advanced developments in jet propulsion, improved aircraft design, and new flying techniques—a priceless source of experience and education.

For example, in the advanced stages of your training, you may fly the TF-80C, pictured above. It's a two-place version of the slick F-80 Shooting Star, fully equipped for both instructor and student—only one of the many Air Force developments that help train the best pilots in the world.

OVER $4,000 A YEAR

Upon graduation, your income as an Air Force pilot and officer starts at more than $4,000 a year. The outstanding men in each cadet class receive regular commissions in the Air Force immediately. Others have good opportunity to qualify for regular commissions during their tour of active duty. There's a month's vacation with pay for you every year and your opportunities for advancement and promotion are excellent.

ACT TODAY!

Both single and married men may now apply. Get your application at your local Recruiting Office or at any U. S. Air Force base. Or write

Chief of Staff, U. S. Air Force,
Attention: Aviation Cadet Branch,
Washington 25, D. C.

For men with two years of college (or can pass an equivalent examination). Between ages of 20 and 26½. High physical and moral qualifications.

U. S. ARMY AND U. S. AIR FORCE RECRUITING SERVICE

NAVAL AVIATION

THE Berlin Airlift, world's most dramatic air-transport operation, is a perfect example of two armed services efficiently working together. The Air Force's planes flying food and coal to blockaded Berlin are entirely powered by aviation gasoline whose delivery to Germany is the Navy's top priority operation. Five tankers deliver approximately 10 million gallons of aviation gas per month to Bremerhaven. Loaded at U. S. ports on the East Coast, Gulf of Mexico, and West Coast, the Navy tankers make the Atlantic crossing in about 10 days at an average speed of 14 knots. Were we at war, enemy submarines could seriously affect America's distant air operations. The world gets increasingly fantastic! Jules Verne, hear this! Now, craft plying deep beneath the ocean could haunt those flying in the air!

THERE is a secret land as large as the United States plus Europe. Its rich minerals would make a Croesus of any man or country. Just recently this land gave up its guarded mysteries to men who risked their lives to penetrate its veil of ice. Flying from ships of the U. S. Navy, daring aviators and cameramen took thousands of feet of color film of rich Antarctica. MGM made it into a most amazing motion picture. Now every American can spend an evening in the "SECRET LAND," see DC-3 transports assisted by spectacular JATO take off from a carrier deck, see with the pilot man's first view of a warm land in the interior where neither snow nor ice hides the coal which lies upon the earth in great profusion and forms an unusual black beach around a clear blue warm fresh-water lake. The movement of a fleet through pack-ice, the wecolming committee of Penguins, the building of a landing strip on snow, the close touch with death when Byrd's plane lost an engine above jagged icy peaks, the lives of Husky sled-dogs and their fuzzy pups, the frightening crash of a helicopter whose rotors become iced, the thrilling rescue of a seaplane crew lost 13 days, "frog men" who swim in icy waters, the Antarctic beauty contest for the beard with most sex appeal, and the cold way of life of brave men behind big beards combine into the most unusual film ever made by man. The "SECRET LAND" is the spirit of the air age; the document which proves man's mastery of geography's last mystery. It is an epic of man's civilization and progress, of stout hearts and strong wings, and America's sea-airpower.

AN effort to investigate the use of rockets in aerial reconnaissance resulted in a rocket-eye view of the world taken by Navy Bureau of Ordnance—Johns Hopkins University cameras flying 70 miles above the earth at a speed of 2700 mph. The photo-mosaic taken from the *Aerobee* shows a strip of earth 1,400 miles in length stretching from Wyoming through Mexico. The total area pictured is approximately 800,000 square miles in area, and the distance along the horizon is 700 miles! On the return to earth one camera landed right side up, dented its base a little, but lens and shutter were in perfect operating condition. All three cameras were salvageable. The black-and-white films were entirely unhurt. For something that had fallen 24 miles through space after it was blown free of its rocket "raft," that seems a major miracle!

THE *Skyknight,* twin-jet all-weather fighter-bomber, is the Navy's latest carrier-based plane. First fighter built by Douglas for the Navy, it includes several novel features. There is an exit chute in the floor for bail-out at high speeds. The instrument panel is news! Letters and numbers on the gauges and dials are etched on transparent lucite and the entire panel is lighted from behind with red light. The plane also has hydraulically operated flaps which jut outward just forward of the tail for quick deceleration. Powered by two Westinghouse turbo-jet engines, the XF3D-1 will be one of the longest range and most versatile of the carrier-based jets.

The Birdmen's Perch

By *Major Al Williams*, ALIAS, "TATTERED WING TIPS,"
Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh 30, Pa.

Will you help us find a guy?

This guy is sole owner of one of the greatest stories of the century. If he'll just step forward and tell his story, we'll make him a Senior Perch Pilot right off. No "bottom rung" qualifications or anything. It's like this:

When the F-86 was trying to break the speed record at the Air Races in Cleveland, the pilot maintained an average altitude of 285 feet during his passes, thus staying in range of the timing cameras.

At that speed and that altitude, he couldn't do any stick horsing to change course without bending the jet somewhat. So he'd start easing down into the slot while he was miles from the field.

Holding his position, he'd rip across the field (and timing devices), and bore right straight on, almost out of eyesight, before he started his gentle, 15-mile wide turn for the next pass.

Well, on one run the smoke-pumper shrieked past a happy character in a putt-putt, about 5 miles west of the field. "I don't think he even saw me," said the Air Force pilot.

"I missed him by about 10 feet!"

That's the story we want to hear! We want to know what the feller in the lightplane thought when that roar went off in his ears and his plane got the turbulence of the F-86.

If you know him—or *are* him—will you get in touch with us, please?

PUMPS AND CIRCUMSTANCES

The new developments in aviation come so swiftly that we have trouble keeping up with them.

A new fuel pump for jets pumps a barrel of fuel in 75 seconds at pressures as high as 750 lbs. P.S.I. That's 3 times the amount of fuel at 15 times the pressure that pumps had to deliver on engines in use during World War II!

We shouldn't be too surprised. The improvements in fuel pumps in the last few years are no greater than the improvements in lubricants, a subject with which we have a certain familiarity.

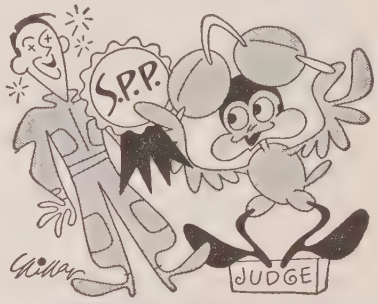
Gulfpride—Series D, the amazing new oil for horizontally opposed engines, does

things for your engine that were never dreamed of a short while ago. It frees stuck valves *and keeps them free much longer!*

It unsticks rings, too, so that they can help deliver power to the shaft instead of the crankcase. Loose carbon and sludge that form in engines are held in suspension by Gulfpride—Series D, and removed by draining.

Gulfpride—Series D, is the only oil in the world made *specifically* for lightplane engines which has had the Alchlor Process extract extra impurities from it.

Try it, and watch your repair and replacement bills dip!



LITTLE KNOWN FACTS

We've only room for one Little Known Fact About Well Known Planes, this month. We're sending a genuine, hard-to-get Commission as Perch Pilot (bottom rung) to Dale Hawk, Carlyle, Kans., for:

"Tire pressures as high as 200 pounds are used on some experimental jets!"

4 more, Dale, and we'll promote you to Senior Perch Pilot, a rank so exalted that strong men swoon when they win it!

And how about the rest of you? Haven't *you* any pet aviation information?

Send it to the address at the top of the page and get the Commission the real Perch Pilots use!

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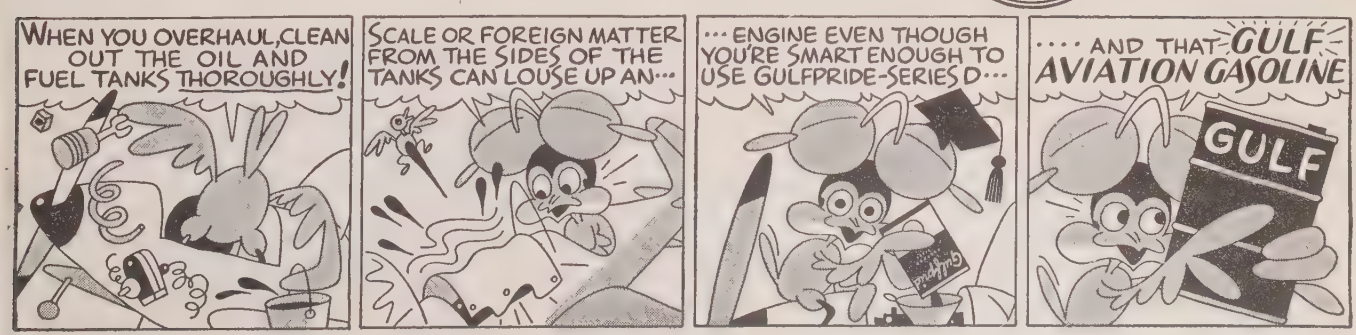
WHEN YOU OVERHAUL, CLEAN OUT THE OIL AND FUEL TANKS THOROUGHLY!
SCALE OR FOREIGN MATTER FROM THE SIDES OF THE TANKS CAN LOUSE UP AN···
···ENGINE EVEN THOUGH YOU'RE SMART ENOUGH TO USE GULFPRIDE-SERIES D···
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"If it's up-to-date aviation news and views you want, read

SKYWAYS!"

See page 45 for the easiest and best way to give a gift at Christmas time, a gift to please every month of the year. Don't miss this opportunity!

PROP WASH

Aero Oddities

Follow the Leader. Although ground fog covered familiar land beneath him, X-C pilot continued on his way. When another plane came in alongside and its pilot made motions toward ground, X-C pilot decided he was being told something was wrong with his plane, so went down through fog and landed at Greenfield Airport. On landing, pilot of other plane came over, shook X-C pilot's hand and thanked him for leading him safely to field. (*J. W. Sargent, George's Mills, N. H.*)

Backwoods Barnstormer. Canadian Department of Transport Inspector, on trip into northern regions, got into conversation with fellow airman, discovered "fellow airman" had no license to fly and was flying an unlicensed airplane. When Inspector asked him how many hours he had flown unlicensed plane, culprit calmly replied, "Wal, I reckon 'bout seven barrels of gas!" (*J. B. Neill, Brandon, Manitoba, Canada.*)

Wrong Number. Cessna pilot on first night X-C tried to call home base for landing instructions. Getting no reply Cessna pilot continued calling. Five minutes later pilot discovered she'd been trying to raise home airport radio with "Cessna radio, Cessna radio, this is Columbia 414!" (*H. M. Harris, Chicago, Illinois.*)

Round Trip. Indiana pilot drove his car from home to school, 30 miles away. After school, he discovered he'd locked car with keys inside. Pilot took bus to local airport, borrowed plane, flew home to get extra set of keys, flew back to town to get car and still was home in time for supper. (*R. N. Adams, Kendallville, Indiana.*)

Near Miss. Pilot of Navy F6F overshot field, fighter bounced to stop on railroad tracks beyond field, directly in path of approaching express train. Pilot climbed from ship and just made gully beside tracks when train hit plane, smashing it to bits. Result—nervous pilot, destroyed plane, undamaged train. (*H. O. Dumas, Springfield, Mass.*)

Bare Facts. A private pilot and his passenger were flying over heavily wooded section of Pennsylvania when engine of their plane quit. Pilot spotted one opening for emergency landing and came down safely. When disabled ship rolled to stop, the two were greeted by an excited crowd . . . wearing absolutely nothing. Pilot and passenger had landed in the middle of a nudist colony! (*J. P. Ricker, Allentown, Pennsylvania.*)

Quick Delivery. While competing in boat race, Dr. Novotny was called back to Los Angeles to deliver baby. The doctor borrowed plane, flew 200 miles back to L. A., delivered baby, returned to scene of 'boat race in time to compete. (*B. Ruskauff, Long Beach, Calif.*)

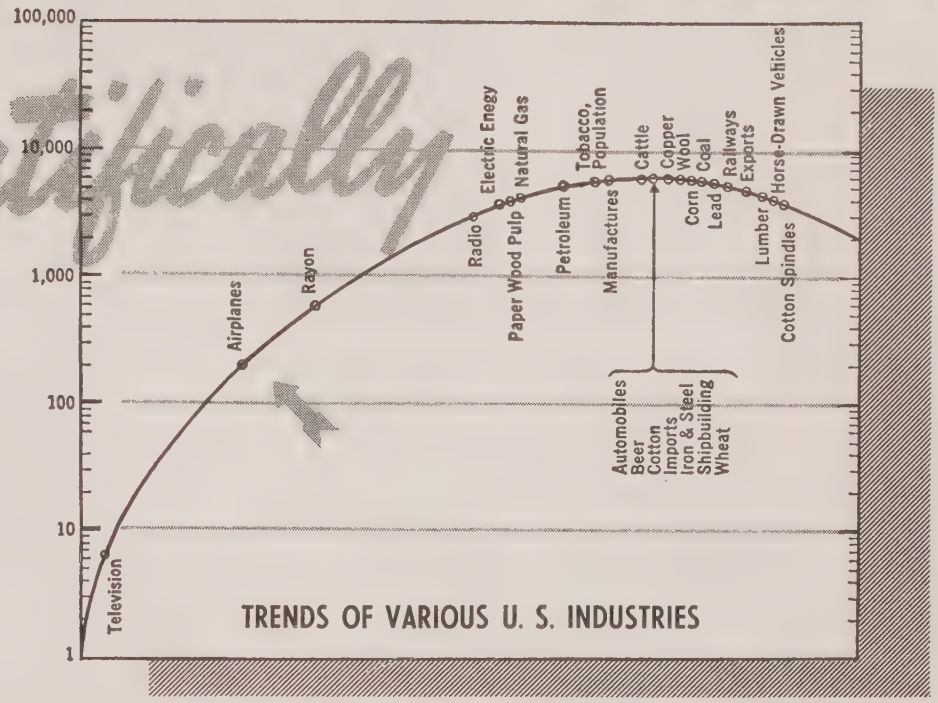
Spot Landing. When an F-80's jet engine quit, pilot glided 70 miles to perfect spot landing at Traverse City airport. (*F. Neason, Traverse City, Mich.*)

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddity" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.

HOW TO CHOOSE A CAREER Scientifically

n their famous book, "Cycles," Edward R. Dewey and Edwin F. Dakin (Henry Holt and Company, 1947) explain the "key to predicting what may come by examining what has been."



YOUR FUTURE IS TOO IMPORTANT TO MAKE A WRONG CHOICE. Study the chart above. Note the position of aviation. Is there any better way of getting into a new and uncrowded field than to choose a *growing industry?* Choose your career scientifically. Select an industry with a bright future. Then get the training to fit you for success on the job.

Spartan, *the University of Aviation,* trains men and women thoroughly for well-paid jobs in aviation. Spartan courses are CAA approved. They are geared to the industry. Here, you train on "live" aircraft, the same type of equipment you will work with after graduation. *You will not need more than Spartan training — you cannot afford to take less.*

Spartan will soon publish a series of "Aviation Career Studies." Write, asking to have copies reserved for you.

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Big an' Mighty B-36

AIR FORCE'S B-36, called "world's largest bomber," is powered by six Pratt & Whitney engines arranged in pusher position

By LT. COL. FRED J. ASCANI

As told to Bud Baer

The author, Lieut. Col. Fred J. Ascani, is executive officer of Flight Test Division at the Wright-Patterson Air Force Base

An Air Force test pilot reports what it's like to fly "the biggest bomber"

THE Consolidated Vultee B-36 is a tremendous plane, both to look at and to fly.

When I flew the first one we received from Convair's Fort Worth, Tex., factory to Wright-Patterson Air Force Base at Dayton, I was overwhelmed by the plane's size and a bit doubtful at first that such a huge ship could take to the air. But after that inaugural flight from Fort Worth to Dayton, I was convinced that the B-36 was not only the world's largest land plane but also one of the greatest engineering accomplishments ever achieved.

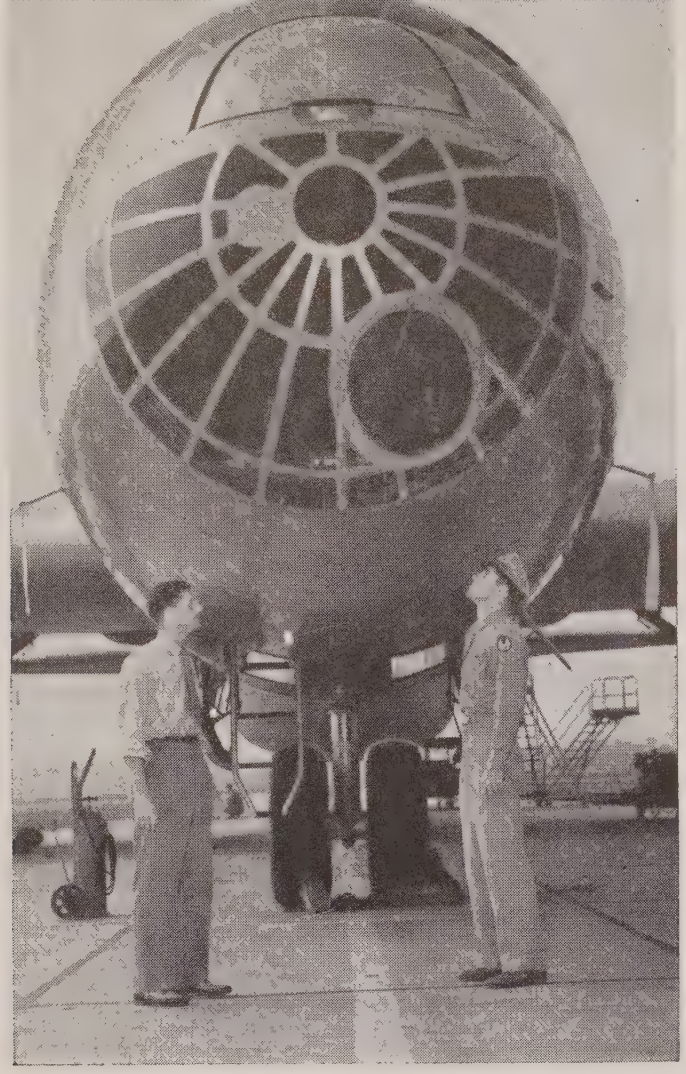
Actually it wasn't until I got behind the controls of the "36" there at the Fort Worth field that I realized how really big the plane is. I

glanced behind and saw the towering rudder pointing 46 feet 7 inches into the air—higher than a four-story building. That rudder was 163 feet behind me—or the distance of three bowling alleys placed end to end.

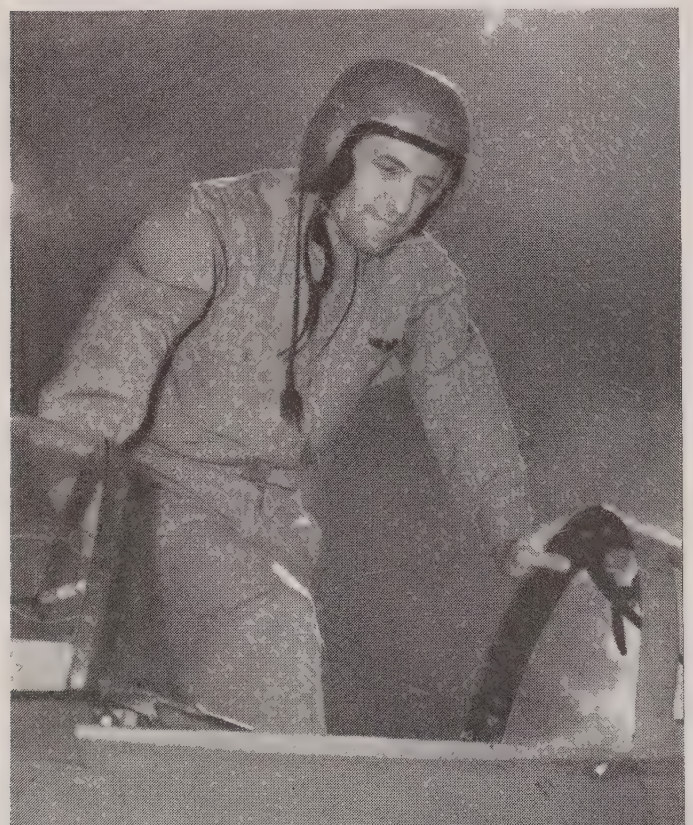
A look at the tips of the long, broad wing made me feel as though I were about to take off in the Empire State Building instead of an airplane. The actual tip-to-tip distance of the B-36 wing is 230 feet, or more than three-fourths the length of a football field, and it's high enough off the ground to permit a semi-trailer truck's being driven under it with room to spare. The fuselage could almost house one of the semi's with its bulky diameter, 12½ feet.

All those thoughts of magnitude were in my mind when I started the "36's" six engines for that initial take-off. One minute we were at the end of the long runway, especially built for the B-36, and the next the immense plane was moving along fast for the take-off. When I felt the nose push into the sky, I thought we were off the ground, but the Convair engineer sitting alongside me said the wheels were still rolling along the runway. This is a characteristic of the B-36 that is different from the take-offs of other

PILOT of B-36, should he turn and look over his shoulder, would see ship's rudder 163 feet behind him. Wing tip to wing tip distance is 230 feet, or more than three-fourths the length of a football field. Rudder is 46 feet high



MASSIVE NOSE of the mighty B-36 gets a going over here by Capt. Keith Karrison (right), PRO for Wright-Patterson Air Force Base, and Bud Baer of the Dayton Journal. Executive Officer at Wright is Lt. Col. Ascani (below)



RUDDER of B-36, designed and built by Consolidated, towers 46 feet 7 inches . . . higher than four-story building

large aircraft. The plane's nose rises some 30 feet off the ground before the ship becomes airborne. This makes the crew in the nose feel they're already in the air when actually they're not. New pilots often have difficulty knowing exactly when they completely break away from the ground.

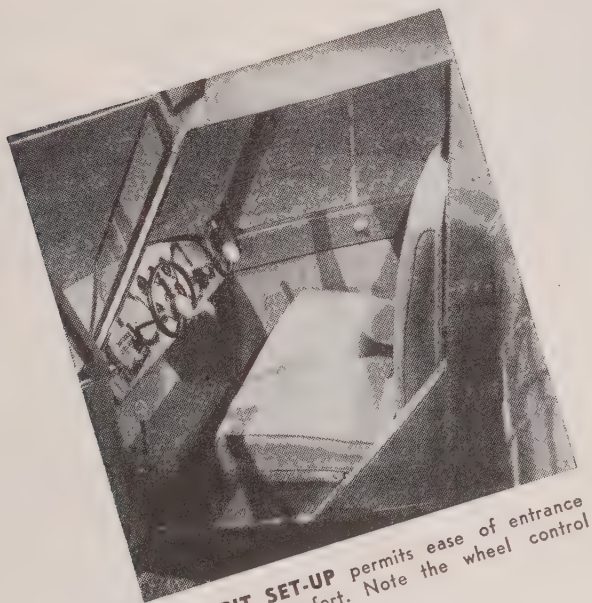
I've found that piloting the world's biggest bomber involves basically the same operation as flying any other large aircraft, such as B-29's or B-17's. However, the physical sensation of riding in it is somewhat different. In flight, the lengthy fuselage and wing have what seems like a fantastic amount of flexibility. I think any pilot will admit it's a little hard to get used to seeing the wings bend three or four feet up and down against the pressure of a strong wind. And the body of the ship has the same type of vibrancy, too. In rough air, the crew takes quite a jiggling and jouncing around. But the B-36, just like any other huge structure, must have flexibility.

The intended operating ceiling of the ship is 40,000 feet.

To many it might seem remarkable that a pilot can press a tiny control lever and move the big plane's massive steering assembly. Unlike other large aircraft where a mechanical booster is employed to operate large control surfaces, the B-36 obtains its turning momentum from a new type tab area, called the Spring Servo Tab. The Spring Servo Tab is attached to the trailing edge of the main control surfaces. When the tabs are activated by the pilot's hand control, they catch hold of the flow of air and the broad steering surfaces are moved in the desired direction, thus giving an aerodynamic boost, sufficient enough to reduce the control force to a minimum for easy operation by the pilot.

In landing the B-36, I found the procedure almost conventional. (*Continued on page 43*)

ANDERSON-GREENWOOD 14 is an all-metal, high-wing, two-place light plane powered by 90-hp Continental engine

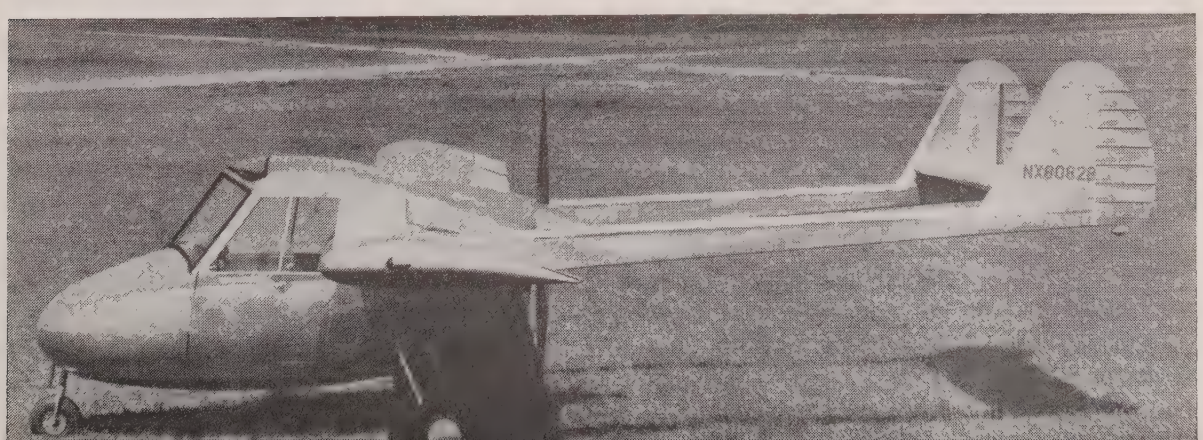


COCKPIT SET-UP permits ease of entrance and flying comfort. Note the wheel control

Meet the AG-14

IT'S been several months since a really new airplane has been introduced to the personal flying public, but the AG-14 puts an end to that lack of something new. Developed by a new aircraft corporation, Anderson, Greenwood & Co., of Houston, Texas, this new design is a two-place all-metal pusher plane powered by 90-hp Continental engine. Flight checks have indicated the AG-14 has a performance equal to or better than conventional designs of similar horsepower, but no specific figures have been given. Feature of the ship is its twin tail boom arrangement and exceptionally easy-to-get-into cockpit.

ENGINE mounted aft of cabin reduces cabin noise level. Baggage is carried in large compartment behind the cabin's seats



PILOT MOST at the controls of his BT-13 circles town of Ensenada, Mexico, after weekend breakfast flight there

TROPHY was awarded Jimmy at Ensenada for winning ETA contest: he arrived 30 seconds earlier than his given ETA

Who Says I Can't Fly?

BEFORE WAR, Jimmy was CPT instructor in Arizona. His ship was Waco UPF-7

By CHASE CRAWFORD

"YOU'LL never be allowed to fly a military aircraft," said the Army Flight Surgeon.

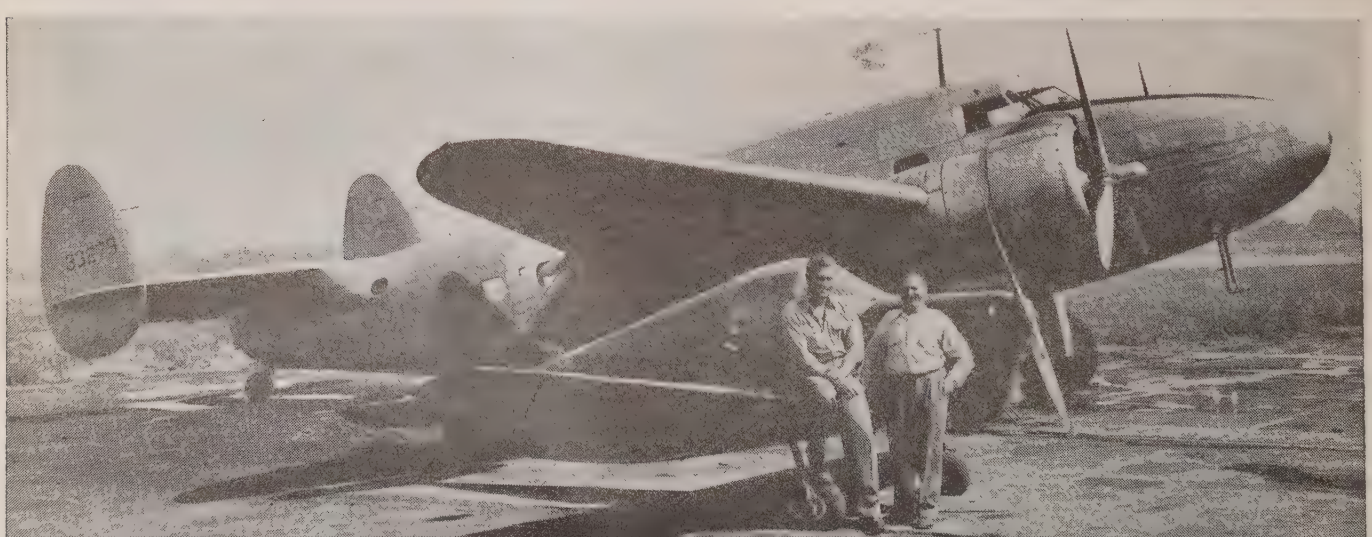
Discouraged and disillusioned, Jimmy Most limped out of the Hospital office at Cal-Aero's Primary Flight School in Ontario, California. He moved slowly; one leg was four inches shorter than the other, there was a permanent bend in his back and ever-present reminders of a long-since broken neck, but he could still fly. It wasn't the first time the flying doctors had turned him down.

Actually the thumbs-down from this Army Flight Surgeon was one of the best things that happened to Jimmy Most in all his 15 years of flying up against difficulties. Two months later he was a factory test pilot for Douglas Aircraft, taking SBD *Dauntless* dive bombers up on their first flights.

"In that way," says Jimmy with a twinkle in his blue eyes, "I got to fly those big military planes before the Army and Navy pilots even got into them."

Jimmy Most has had enough strikes against him to keep the average pilot on the ground for life. When he was only seven years old, he was stricken with infantile paralysis. During his recovery in Laurel, Nebraska, he listened to the glowing stories of the early days of the Air Mail service. Planes from the first night mail route landed at Sioux City, Iowa, just 40 miles away, and the hair-raising exploits of (*Continued on page 46*)

BIG OR SMALL, Jimmy Most flies them all. Here he and "Salty" Bacon show off an old Culver Cadet and Lodestar



STUDENT opinion has always been that check ride with Jimmy was worth more than two hours with anyone else

CESSNA dealer, Jimmy here demonstrates a ship to a prospective customer. His sales talk is an easy flight

FIFTEEN YEARS of flying have netted Jimmy 4,500 hours of flight time in everything from an old OX-5 to this DC-3

BONANZA, one of three bound for Brazil, gets wheeled out of hangar at Beech factory just prior to take-off for S. A.

Destination... BRAZIL

BRAZIL-BOUND BONANZAS line up beneath wing of PAA'S "Fearless." Photo was made few minutes before all four took off

THREE GIRLS and a boy made up ferry group. Only pilot with over-water experience was former ATC'er Clifford

By BYRD HOWELL GRANGER

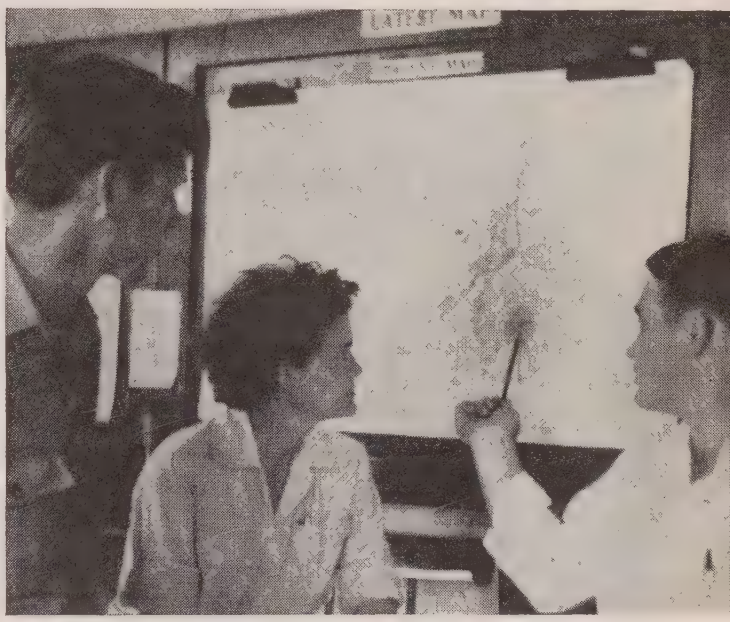
LAST September four pilots ferried Beechcraft *Bonanzas* from the home factory in Wichita, Kansas, to Rio de Janeiro, Brazil, the land of the rhumba, rubber and rivers. True, there's nothing unusual today about a ferry trip to South America, but this trip was just a *little* different—three of the four pilots were women, marking the first time women pilots had made

THIRTEEN DAYS after ferry pilots left Wichita, Kansas, they were in Rio, viewing lights of the city from Sugar Loaf

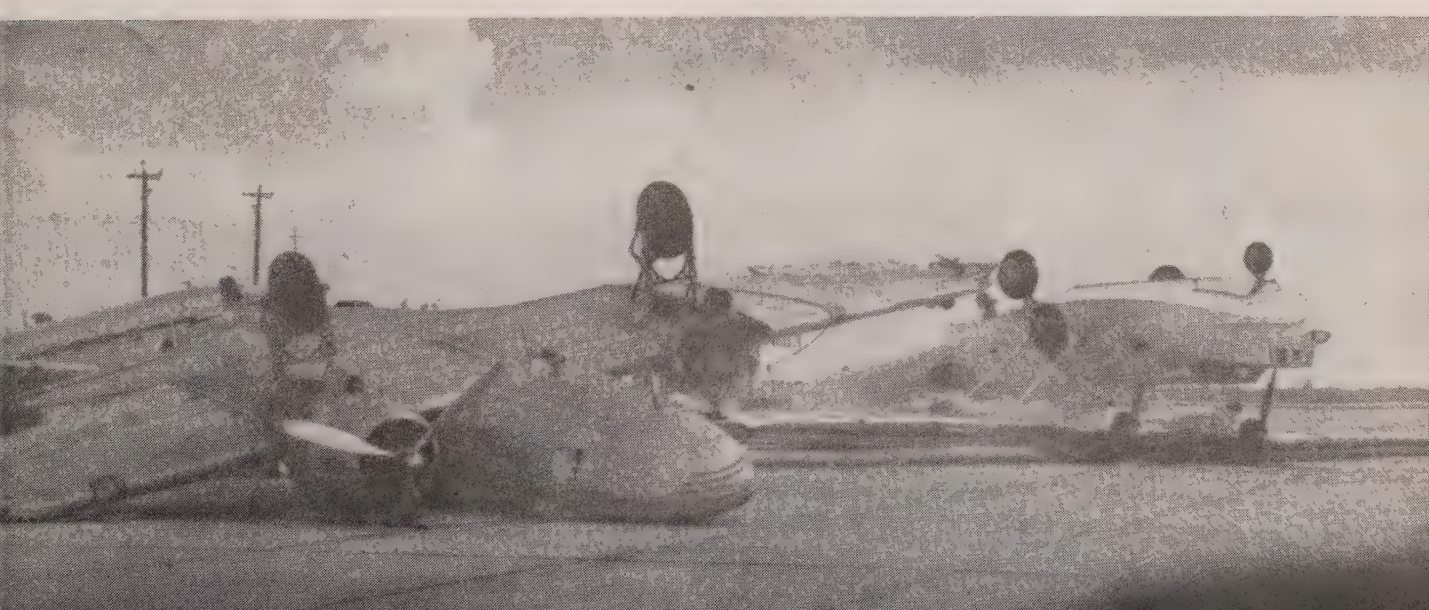
the long trip south of the equator to deliver aircraft. It took some persuasion to convince Beech officials that South Americans would not cringe at the sight of women ferry pilots. As it turned out, the Latin Americans were far more curious and intrigued by us than they were dismayed. Crowds gathered at each stop along the way as pilots Ruth Dailey, Delphine Bohn and I climbed out of our ships for a little ground exercise.

Fourth and most important member of the ferrying crew was John Clifford, the only one of the group with an A & E license and extensive over-water flying experience. John had spent the war years as a transoceanic pilot for TWA; the girls had all been WASP's. John's patience, his sense of humor and talent as a diplomat proved itself on that trip which, as all men undoubtedly will agree, couldn't have been easy with the balance of power so definitely on the female side.

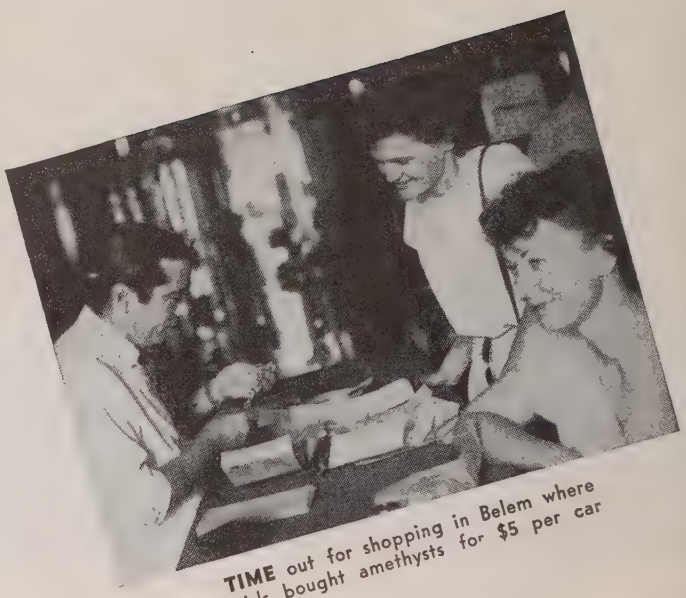
Several weeks before the trip, your reporter was chosen as the committee of one to get the



FLIGHT was grounded in Tallahassee, Florida, for several days because of hurricane off coast. Here Ruth Dailey and John Clifford (left) study map with forecaster. Storm did plenty of damage in Miami as evidenced by photo below



FLIGHT deviated northwood to Cap Haitien for look at famed Citadel. Nearest airport is in valley by seacoast



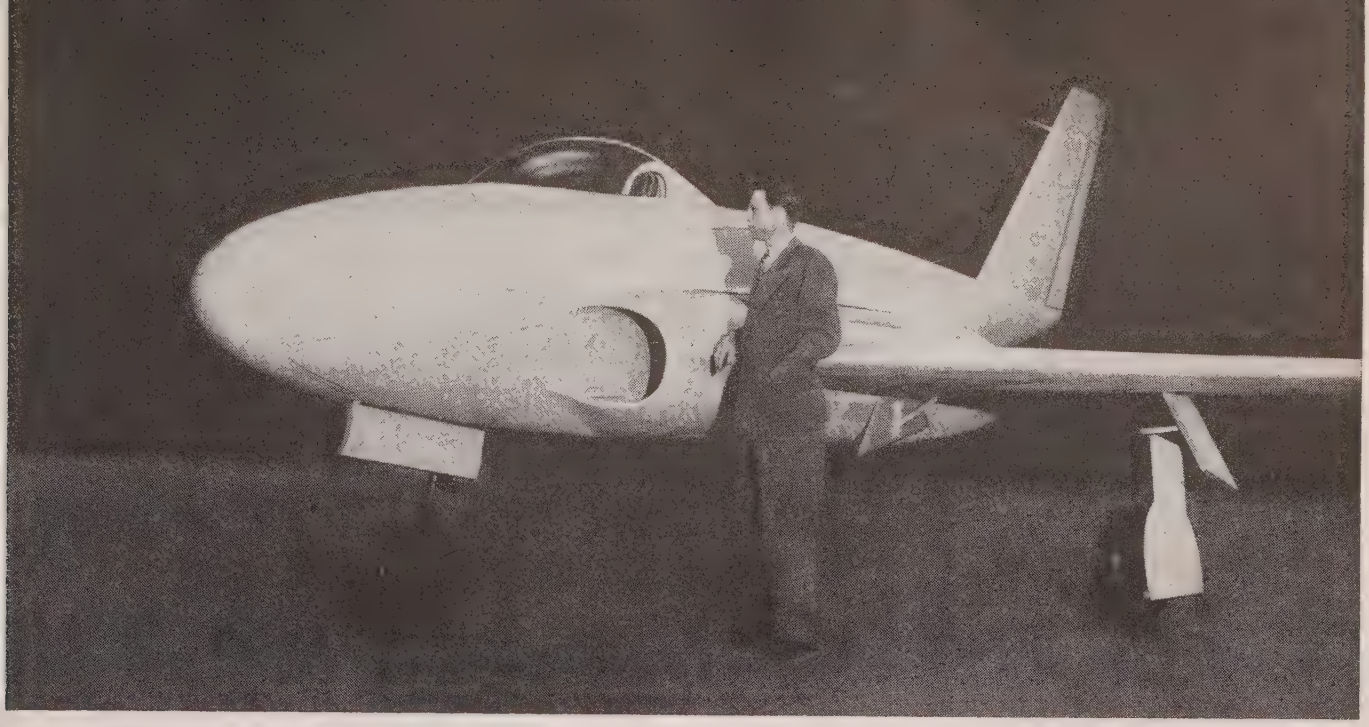
TIME out for shopping in Belem where girls bought amethysts for $5 per car

AIR TRIP from Trinidad to Georgetown saw end of over-water flying and first over-jungle flying. Planes hugged shoreline, preferring forced landing in water to jungle. Refueling always was done through chamois (below)

preparations started, and within a very short time my desk was piled high with letters and cables regarding visas and flight clearances into the nine countries along our proposed route; passports and permission to take aerial photographs; emergency equipment and immunization requirements; pilot and plane insurance; maps and countless other data. Following the accumulation of that came the actual trip preparations—assembly of papers necessary to have with us; vaccinations that made four left arms look like the plague; and four statements assuring "whom it may concern" that none of us had criminal records. While not all the vaccinations we had were required, we each felt that the proverbial ounce of prevention would be well worth considerably more than a pound of cure, particularly in S. A.

Costs mounted daily. Greatest expense was the insurance we had to have for three airplanes plus our own short-term life and accident policies. This totaled close to $2,000 . . . and had to be shelled out of four pockets before we could write "finis" (*Continued on page 48*)

OVER-NIGHT stop at Zandery, Surinam, found ferry group bunked in PanAir station agent's quarters at the field



NORTHROP'S X-4 is patterned after its Flying Wing. A single vertical fin and rudder provide lateral control

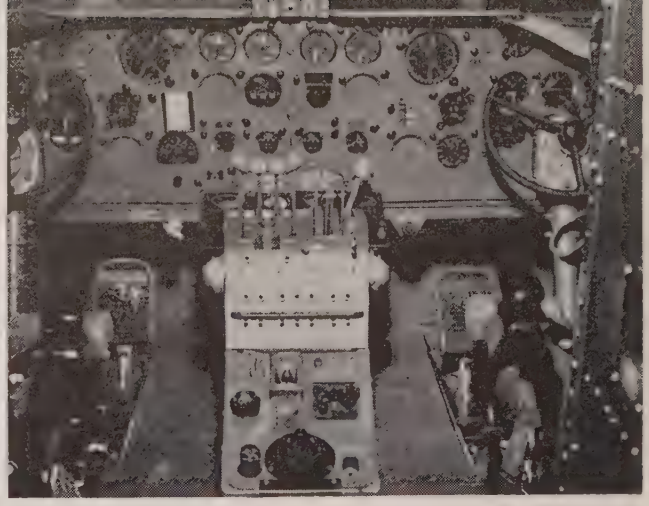
Experimental

FOR months it has been a well-known fact that Northrop Aircraft was engaged in the development of a highly secret sonic-speed research ship to carry on the high-speed test program of the NACA, USAF and Navy. Northrop's ship, the X-4, is a tiny craft having a wing span of only 25 feet and is but 20 feet long. The Air Force describes it as "designed for stability and control investigations on swept-wing aircraft of the semi-tailless type for high-speed flight." X-4 is powered by two Westinghouse 19XB jets.

MARQUARDT Aircraft of Venice, California, recently announced the completion of successful test flights of the first known pulsejet-powered helicopter. Dubbed the *Whirlajet*, this 'copter will carry twice the payload of equivalent conventional 'copters because of the elimination of the heavy internal combustion engine and its required transmission, clutch, free-wheeling assemblies and complex fuel and ignition systems. Power is supplied by two pulsejet engines, one mounted on each tip of the rotor wing.

TEST PILOT at the controls of Whirlajet, first pulsejet-powered helicopter, is Bill Davis, of Marquardt Aircraft

FLIGHT ENGINEER on XR60-1 operates all engine controls except on take-off, landing. Note array of instruments



PILOT'S OFFICE is laid out for maximum pilot convenience. For night flying, indirect red light is used

MULTIPLE GEAR on Constitution decreases weight of landing gear, reduces danger of blow-outs. Vanes pre-rotate wheels to reduce landing shock. A light on the pilot's panel tells him when plane is on ground. Note chocks

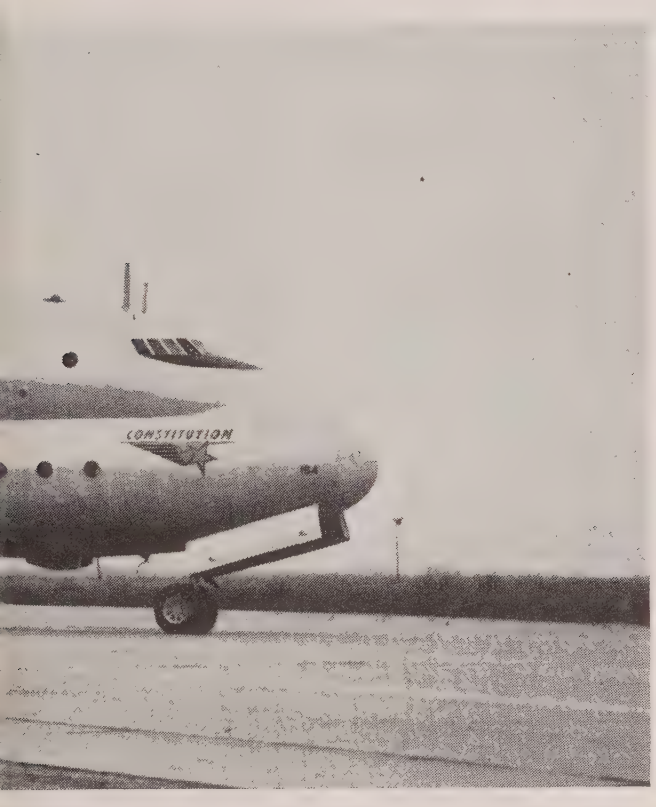
92-TONNER

DECKS of the ship are connected by spiral staircase. Cabin is completely pressurized, seats 82 in upper section

ONE of the largest airplanes ever built for the Navy is the XR60-1 *Constitution,* a product of the engineering genius of Lockheed Aircraft in California.

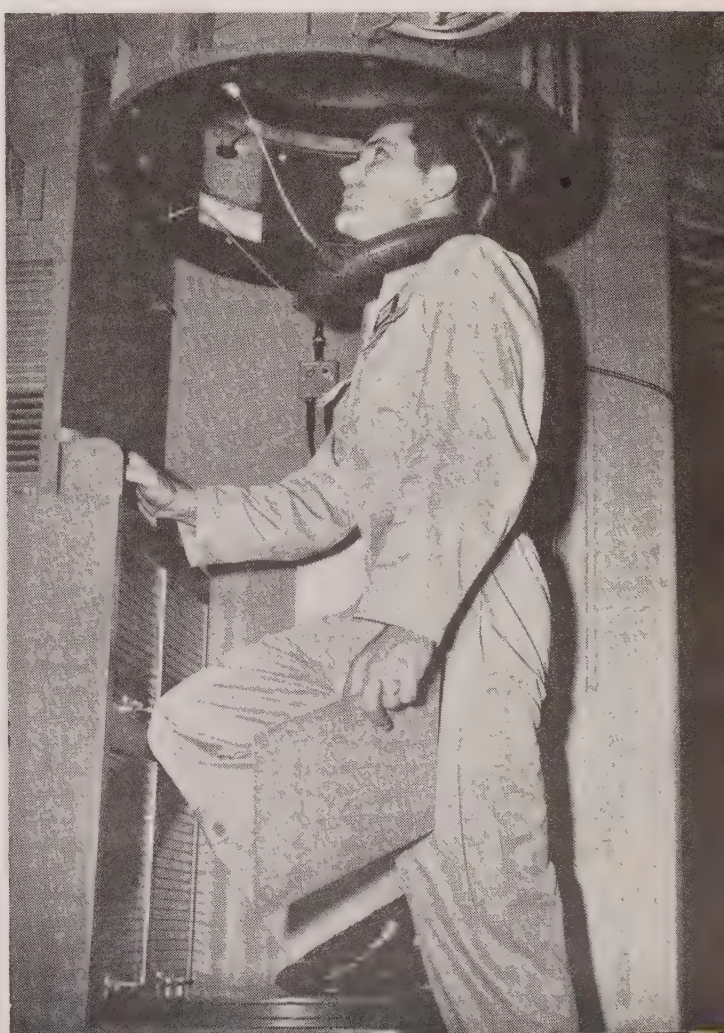
Designed as a transoceanic transport, the *Constitution* is a twin-deck giant that will seat 168 passengers, and has a crew of 12. Powered by four Pratt & Whitney *Wasp Major* engines, the XR60-1 has a reported top speed of 303 mph at 20,000 feet. Its maximum range with maximum fuel load and at economical cruising of 238 mph is 6,300 miles. Service ceiling on four engines is 27,600 feet; on three engines, 20,700 feet.

The *Constitution* has a wing span of 189 feet; is 156 feet long, and has a gross weight of 92 tons. At the ship's maximum landing weight of 160,000 pounds, the *Constitution* can land over a 50-foot obstacle and come to a stop in 2,300 feet. It stalls out at 80 mph.



INTER-COM SYSTEM keeps the two flight orderlies in touch with crew, and is in use on both upper and lower decks

NAVIGATOR on duty aboard Constitution need not fear being sucked out of dome. New harness anchors him tight



ARCTIC Survival

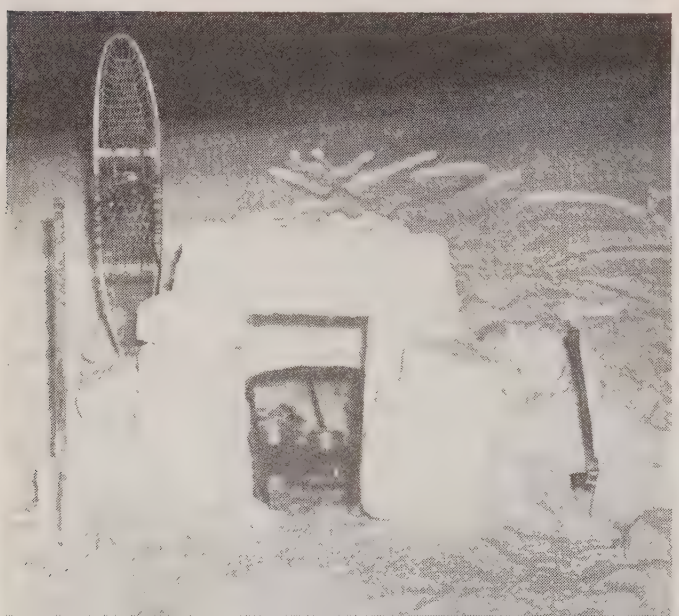
ARCTIC Indoctrination School students cut blocks for construction of snow house. A short saw is best tool

"The Air Force C-47 was flying at 9,000 feet over the snow-covered Alaskan terrain, the ground a sharp-peaked winter wasteland beneath. The crew was relaxed with no premonition of danger whatsoever. Then suddenly without warning, the number one engine faltered and stopped—its propeller windmilling and setting up dangerous vibrations. The pilot feathered the propeller, then notified the crew to be on the alert. The plane lumbered along on one engine for a few minutes, then suddenly dipped sharply to the right as the number two engine cut out. The pilot, after a tense moment of indecision, notified the crew to stand by for a crash landing. Down, down, down the plane rushed, the altimeter needle making one, two, four, eight sweeps around the face of the instrument. The crew was tensed for the shock of the crash landing—their stomachs tightening with the intensity of their emotions. What awaited them?"

THE answer to this question could mean a great deal; it could mean men stranded in a disorganized jumble on the far stretches of the Northern Arctic Terrain—men with injured comrades, men without purpose wasting their energy in futile at- (*Continued on page 50*)

SNOW HOUSE, built on shore of Bering Sea by AID students, can't be called spacious living but it's often difference between life and death. This photo (below) shows central room; sleeping quarters are on either side

NIGHT SHOT shows two "downed" airmen fixing evening meal. Tent is made of "Arctic Willow" and signal pines



AIR FORCE C-47, with prop of one engine feathered, was forced down in the Arctic's sharp-peaked winter wasteland

HALVORSON woodsman proudly displays freshly cut tree that will brighten some home when the Christmas season rolls 'round

MINNESOTA woods below, Halvorson cruises his Navion in search of new timber. Yearly he sells over million trees

OUT Minnesota way, in the land of forests and lakes, busy little beavers have been causing a lot of damage to that densely timbered country. Into unsettled regions, seldom visited by man, hordes of beavers moved, multiplied, and built dams which resulted in the countryside's becoming flooded.

Making daily flights in the company *Navion* over this almost inaccessible area, employees of Roy E. Halvorson, the Duluth "Christmas tree king," noted the destructive results of the beavers' activities. Halvorson trees are cut from vast stretches of muskeg bog in this wilderness, and the valuable timber literally was being drowned by the raised water level.

Convinced that such destruction was far in excess of the fur value (*Continued on page 57*)

AIRPORT used by Christmas tree king is strip cut out of woods. Here Halvorson (right) and airport attendant tow Navion to parking area. Whole Halvorson family flies. The trees (below) are brought out of woodland via tractor

TRIP to Halvorson's woodland calls for flight by Navion, ride on truck, time on tractor, then a session on foot

PILOT-AUTHOR DOWNIE took this head-up shot of TF-80C as it came in for landing at Van Nuys Metropolitan Airport

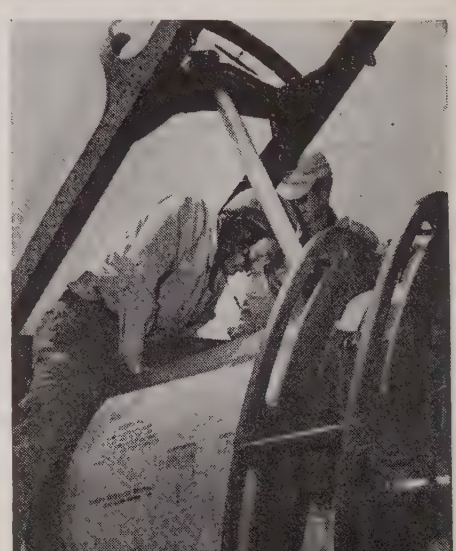
My First 30 Minutes in a JET

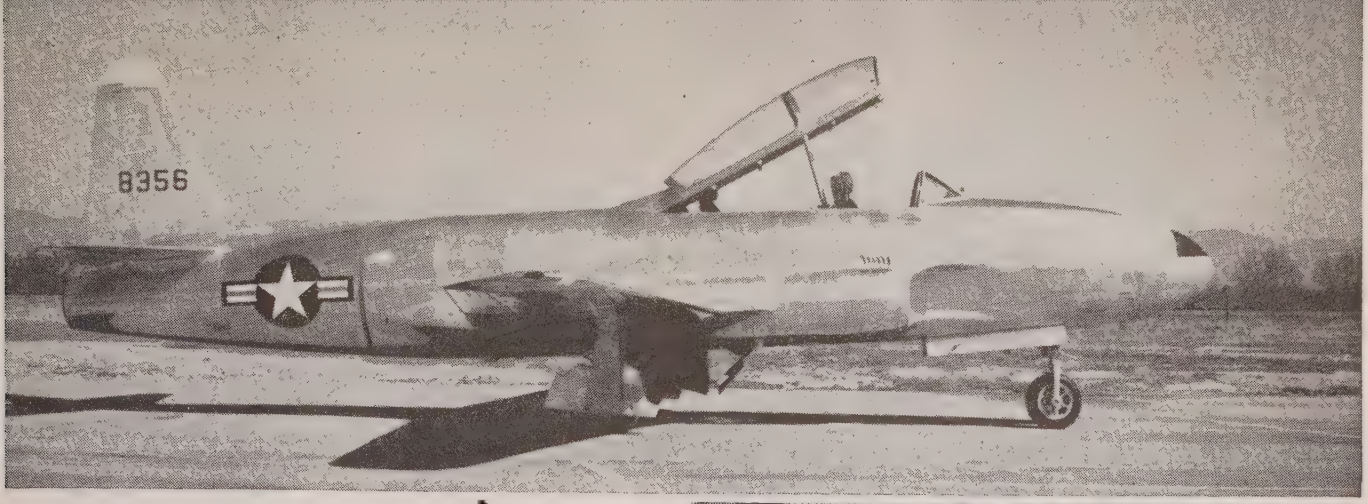
PILOT of TF-80C on demonstration hop was Lockheed's "Fish" Salmon

By DON DOWNIE

In which Skyways' test pilot climbs out of a Cub and into a jet for a try at 600-mph stuff

COPILOT in ship's elongated cockpit was Pilot-Author Don Downie





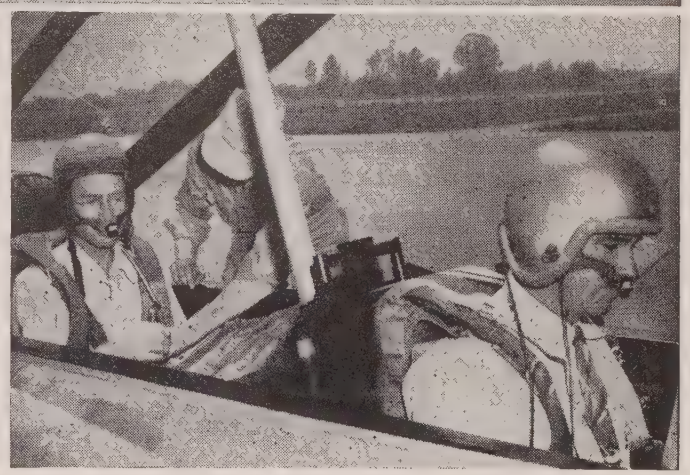
TRAINER version (above) of the F-80, called TF-80C, is 38 inches longer than the standard F-80 jet fighter

HOW does it feel to fly a 600-mph plane? It's surprisingly smooth and quiet; that roar is all behind you. The earth moves by at a startling pace—just like it was a big yoyo and you were flicking the string. It takes the whole San Fernando Valley to turn around at high speed.

Here's what it's like to fly an F-80.

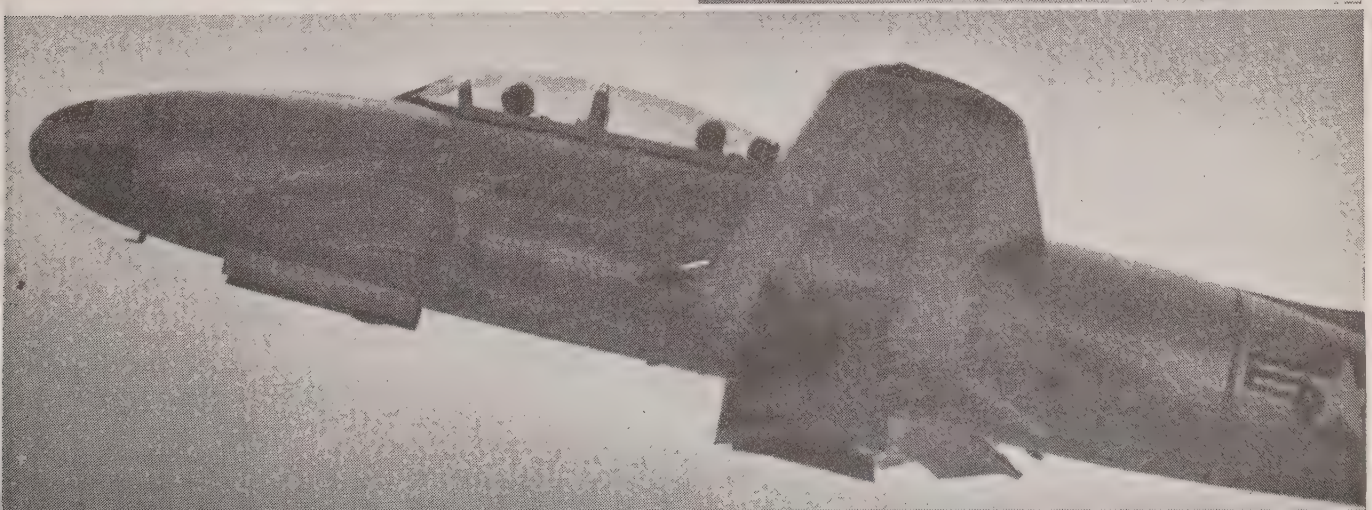
The two-place TF-80C is just like the standard Air Force fighter except that the fuselage has been lengthened three feet for the second cockpit. It has the same speed, the same spectacular rate of climb and the same ease of roll as the standard fighter. The orginal two-seater, in fact, was taken off the regular fighter assembly line, cut apart and expanded. The air intake ducts were lengthened and the electrical and hydraulic systems were stretched out.

Factory representative on this 30-minute SKYWAYS' pilot report was Herman "Fish" Salmon, 35-year-old Lockheed engineering pilot with 4,500 hours, mostly in pea-shooters, under his safety belt. He did all the spin tests on Lockheed's P-38 and flew many of the dive tests on the F-80. Fish probably knows the F-80 better



INTER-COM system for conversation between Salmon in front cockpit and Downie in rear featured new model lip microphone. Ship's seven-foot canopy is raised (below) and lowered by an electric motor operating off battery

AUTHOR Downie banked TF-80C into what he thought was level turn . . . and found he'd gained 2,000 feet doing it



FLIGHT OVER, Salmon and Downie climbed out of cockpit, with Downie admitting 600-mph flight left him groggy

than anyone. We flew from the Van Nuys Metropolitan Airport in the famed San Fernando Valley, since Lockheed doesn't like to fly its jets in the slow-moving heavy traffic surrounding the smog-filled Air Terminal at Burbank. They go too darn fast!

As a courteous confidence remover, Lockheed arranged a $25,000 insurance policy with Lloyds of London to cover any visiting reporters.

When ground crews finished refueling the sleek F-80, we climbed aboard. The cockpits are alive with instruments—many standard "gauges" familiar to the prop-driven pilot and a scattering of new instruments found only in the 10-mile-a-minute jets. No so-called conventional plane has a tachometer that goes up to 12,000 RPM, a tailpipe temperature gauge that reads over 1,000 degrees or an air speed indicator red-lined at .8 Mach.

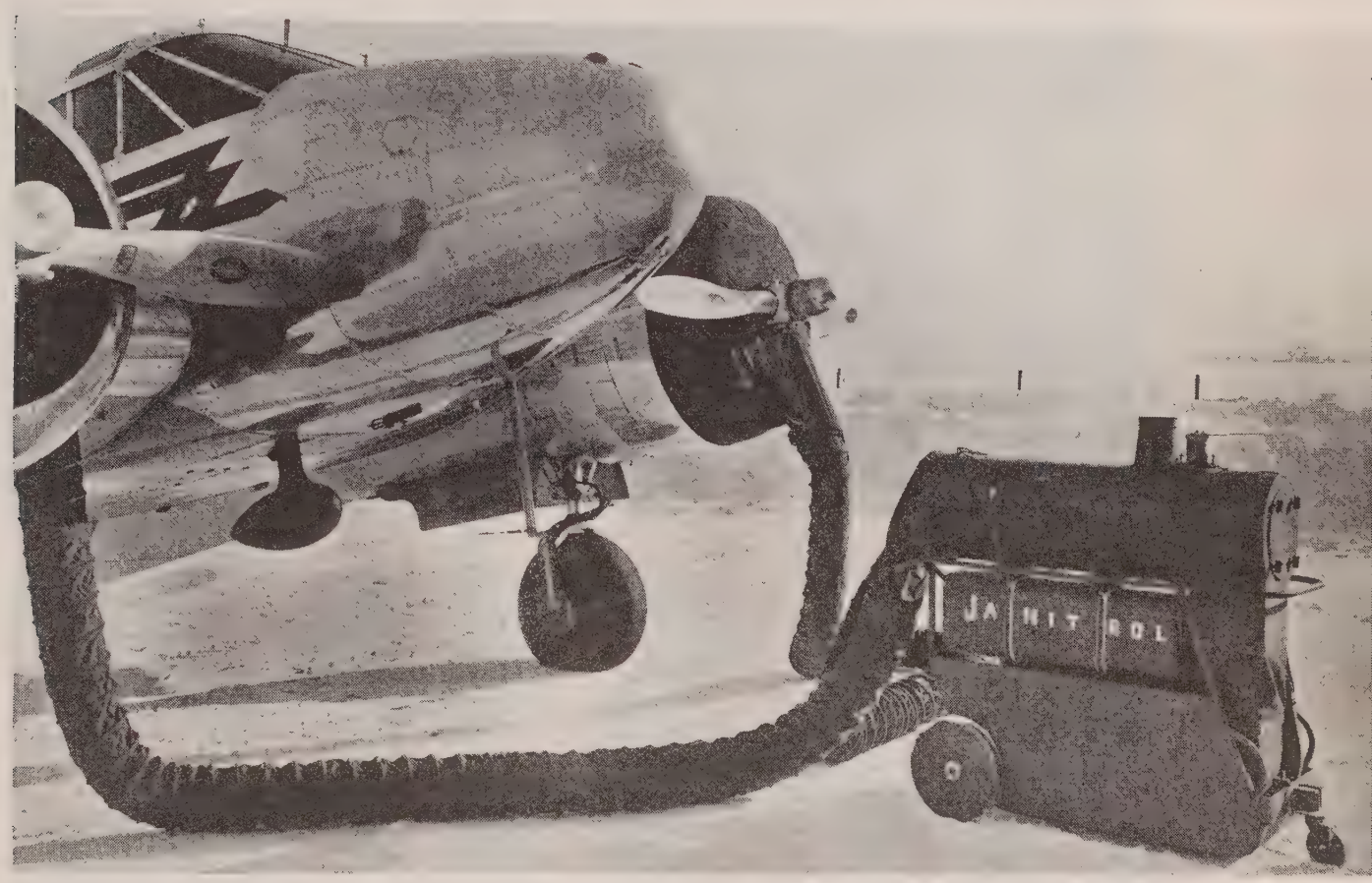
We wore a crash helmet fitted with ear phones and talked to "The Fish," as Mr. Salmon is usually called, with a new model lip microphone that hooks over the ears and looks like a Hitler mustache. Shoulder harness was a must, too.

"Are your arms inside the pit?" asked "The Fish" over the inter-com before he flicked the electric switch to lower the big plexiglas canopy. It closed slowly like a giant clam-shell and Salmon's gold crash helmet in the front pit looked for all the world like a Technicolor pearl. This canopy was one of the big design headaches in converting the F-80 into a trainer since extreme suctions develop at high speeds. The seven-foot "glass house" is stressed to withstand 18,000 pounds, equal to 12 G's at 600 mph. The canopy is held in place by eight hardened steel hooks that lock into four triangular attachments on each side of the canopy frame. Each of these fittings will lift more than the empty weight of the airplane, 8,084 pounds.

Tinged behind the rear cockpit, the canopy is raised and lowered by an electric motor operated from the plane's (*Continued on page 60*)

ASSEMBLY LINE at Lockheed shows the jet fighters in production. These will provide the USAF with interim power

Cold Weather Flying



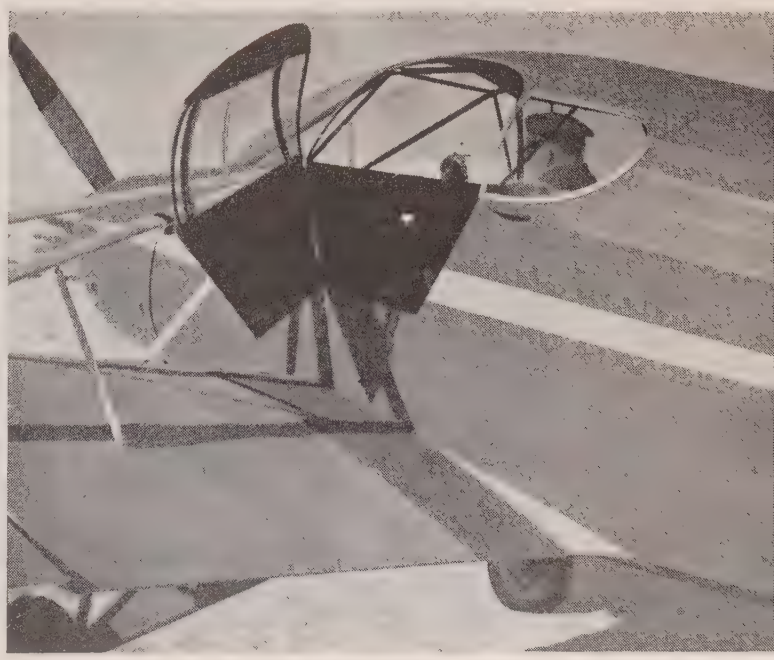
COLD WEATHER CUES call for preheating of engines. This service (above) is provided by some operators. If, after preheating, there is time consumed taking on passengers, shut off engine. Oil will stay hotter if engine is off

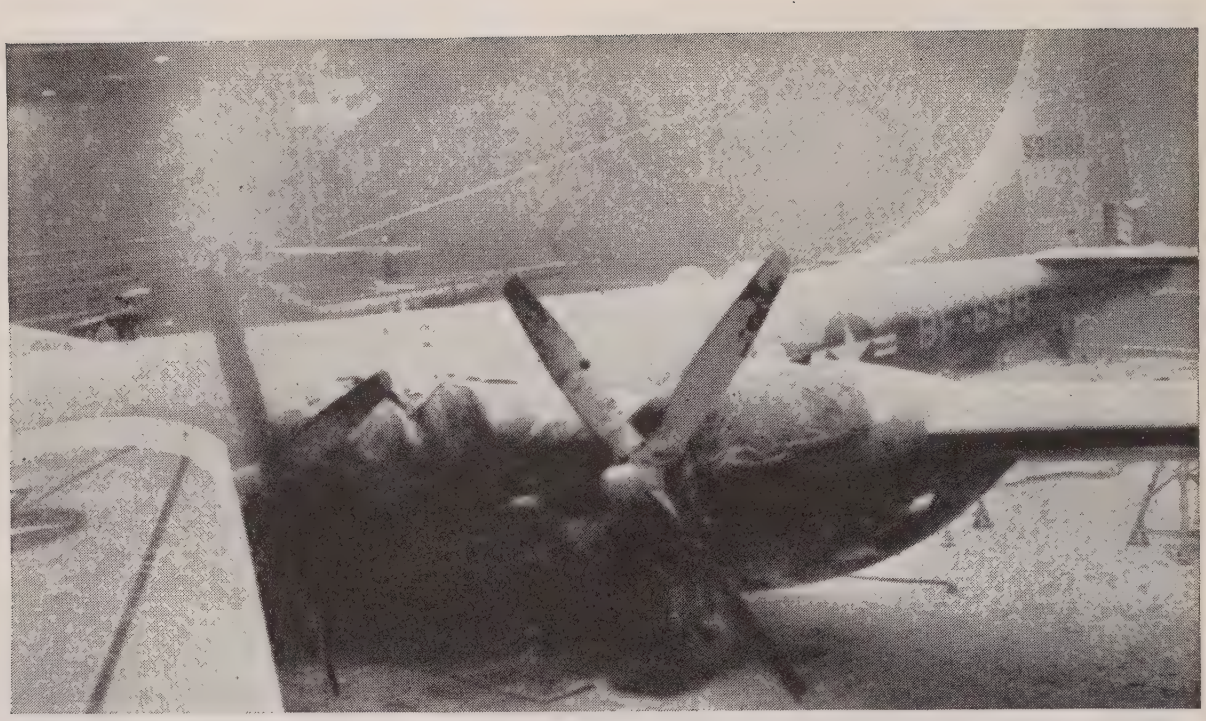
By FRED G. POWELL
Accident Investigation Div., CAB

OPERATING airplanes successfully in really cold weather requires knowledge of cold-weather facts. All kinds of things can happen to planes in the sub-zero temperature of the Arctic or even of our northern States during winter. *Gremlinis borealis* has nothing to do with these troubles any more than *Gremlinis tropicanus* causes wasps to plug up gas-tank vents. The troubles are real and generally can be prevented.

Records of the Safety Bureau's Accident Analysis Division show a great variety of accidents and near-misses during severe cold. But rather than present these facts by statistics, which would not be too enlightening because of the great diversity of the accidents, let's take up some of the common conditions and their causes.

The subject is long and complex and therefore





USAF is making concentrated study of Arctic operation of military aircraft via Air Force's Climatic Hangar at Eglin

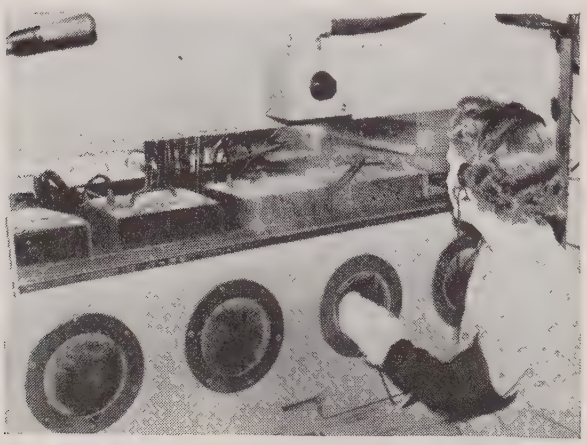
the following brief notes cannot be much more than generalities.

Winterization Service Changes of Aircraft

Most aircraft are designed and manufactured for operation under normal climatic conditions. Alterations, service changes, or installations are necessary before the average aircraft can be satisfactorily operated in sub-zero temperatures. Due to varied construction, each model should receive different treatment; also, the degree of cold and type of operation require considerable study before satisfactory winterization can be made.

Lagging on oil lines, oil tank, etc., should maintain oil above the minimum operating temperature. As the oil temperature gauge on most planes records the temperature of engine in-going oil, an additional gauge indicating engine out-going oil temperature is helpful. Oil within the engine may not be sufficiently heated for proper lubrication. Pilots frequently use engine oil of very light viscosity for better circulation and pumpability immediately after starting, and for better circulation when the proper minimum operating temperature cannot be maintained. Beware! Oil viscosity does not indicate quality; therefore, a light viscosity may be "watery" at operating temperatures. *Viscosity index* does indicate quality, i.e., the change of viscosity over a temperature range. Always use high quality oil of suitable viscosity but of low viscosity index so it won't thin unduly at operating temperature. Cheap oil can cost you plenty.

AIRCRAFT RADIO equipment also must withstand extreme cold. Here Bendix radio instruments are being tested



When oil is drained for later preheating, use caution in handling. Covered cans are desirable. If an operator has more than one plane, use a separate can for each ship—then if any metal is found in any can there will be no question about which ship it came from. A small amount of foreign matter in the oil can clog the oil screen or shear an oil pump shaft.

Oil and grease of standard properties when used on retracting landing-gear mechanism, especially slide-bearing tubes, may congeal to the point of seizing. Use dry, finely powdered graphite wherever possible. Grease should be removed from worm gears and frequent applications of light oil, such as penetrating oil, used instead.

Additional cowling is sometimes needed in front of oil pumps on radial engines, engine-nose

TEMPERATURE within the Climatic Hangar is —70° F. Note heating ducts and other equipment being used on this F-47

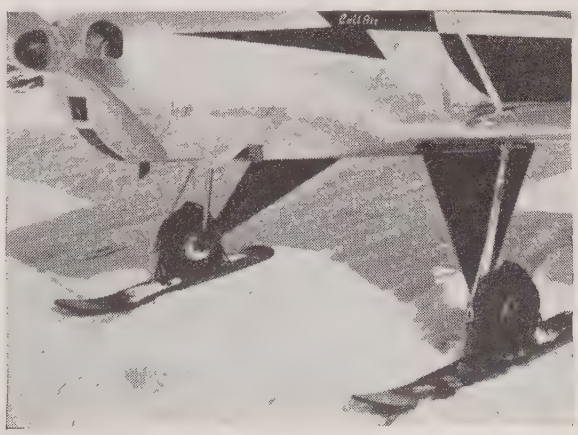
section, and propeller governor, etc. However, sometimes cylinder-head temperatures are abnormally lowered by nose cowling or attachments, due to a misdirected concentration and increased velocity of air stream. Operators have had best results in controlling temperatures by *partially* restricting the exhausting air openings, such as louvres in rear-engine cowling of smaller aircraft and at trailing edge of engine rings of the larger ones. Warning: Cowling changes should be properly engineered as even small changes can cause bad heat distribution.

Congealed grease or oil in engine and aircraft controls, especially the housed-shaft type, may make them immovable during very cold weather—clean, and then use a lighter lubricant. Another caution: Assuming that a push-pull type of throttle control can be moved only with difficulty as the engine is started, and this control "limbers up" as the engine warms, damage can still be done (which may not be apparent until after take-off), resulting in lack of engine control.

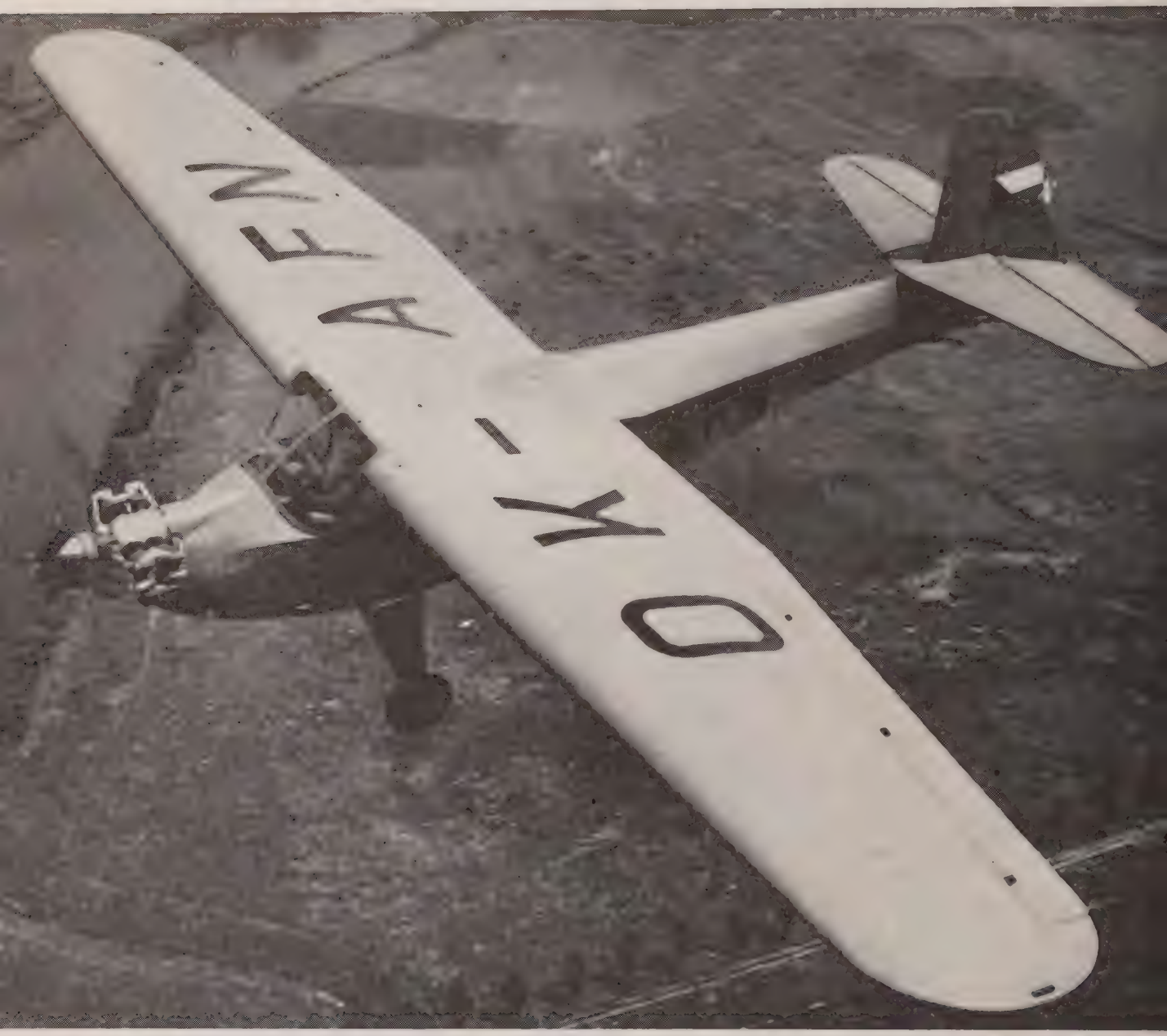
Note: It is a widespread belief among pilots that the warmer the cockpit or cabin, the greater is the likelihood of *inside* frost forming on windshields and windows during sub-zero weather.

This is not true, as the inside frost occurs only when the windshield temperature is 32 degrees or below and the dew point of the inside air is 32 degrees or above. The rate of accumulation of frost on the inside increases with the spread between the dew point and the windshield temperature. The temperature of a single glass windshield results from a combination of the temperature outside and inside. However, with rapid circulation of air against the windshield on the outside and little or no circulation on the inside, the windshield has a temperature much closer to the outside temperature. If, however, a fan is directed on the inside so as to circulate warm air rapidly over the windshield, the temperature of the windshield will be raised, which will tend to minimize frost both inside and outside. In addition, the rapid circulation on the inside will cause increased evaporation, which, in many instances, will keep the inside clear of frost. It is obvious that the dew point in the cockpit will usually be higher than that of the outside air, due to the addition of moisture from the bodies and (*Continued on page 52*)

SKI INSTALLATIONS require care, too. Before putting skis on your ship, get the low-down from experienced ski pilot



Modern Czech Aircraft

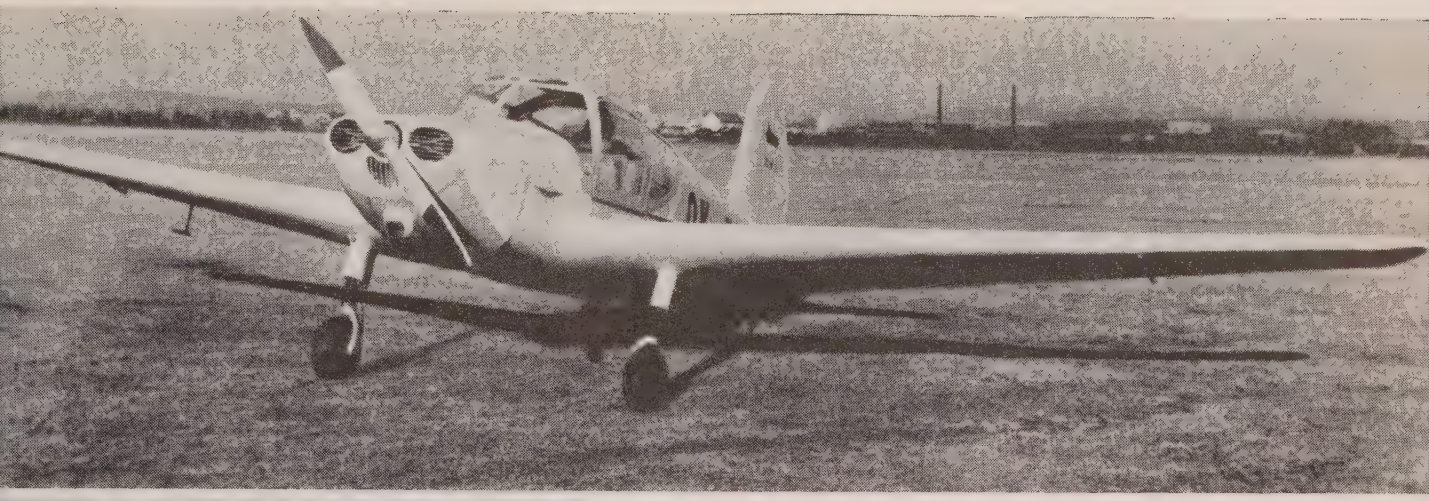


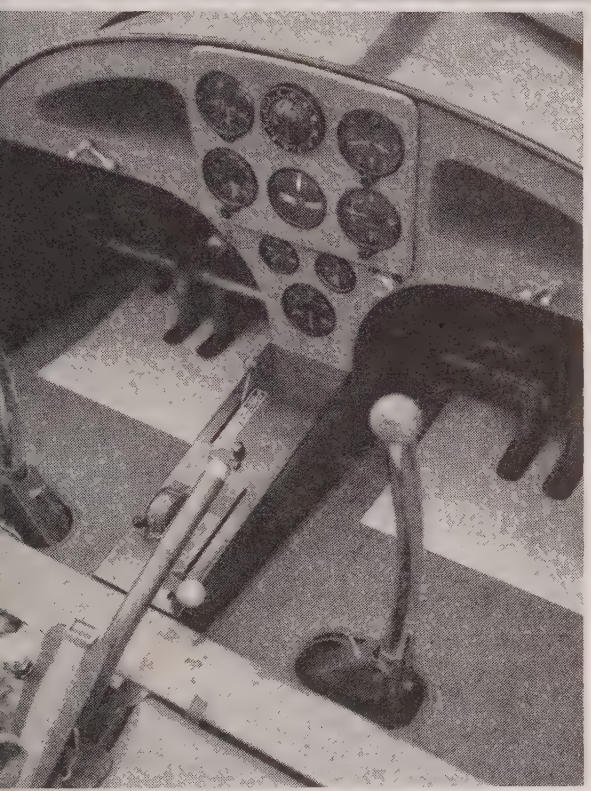
PRAGA E 114, called "Air Baby," is two-place training type ship. It has cruising speed of 112 mph, 435-mile range

By H. MANLEY, B. Sc., and D. I. C.

SINCE the liberation of Czechoslovakia, indications are that the Czech aircraft industry has been recovering quite rapidly from the effects of the German occupation. The major manufacturing firms forcibly incorporated in the German war-production program, have been entirely reorganized and merged into two large nationalized combines. They are:

1) Motor Car Works, including Avia, Mraz, Zlin and the Auto-Skoda motor car works;
2) Aviation Works, which includes Aero, Praga, Letov and Walter.





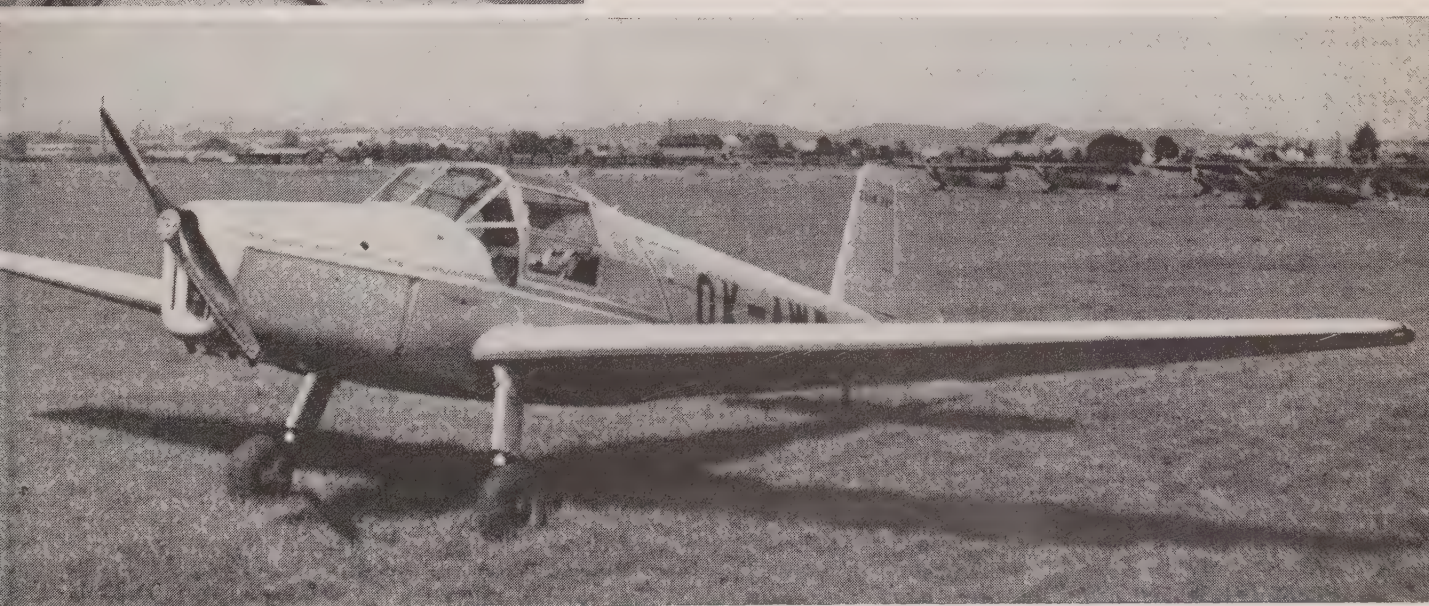
ZLIN 22 is another Czech personal plane. It seats two, side-by-side, is powered by 75-hp engine, has 100-mph cruising speed. Cockpit of this airplane (above) is neatly arranged (left), and it employs dual controls

All the firms making accessories and components have been merged into a third corporation.

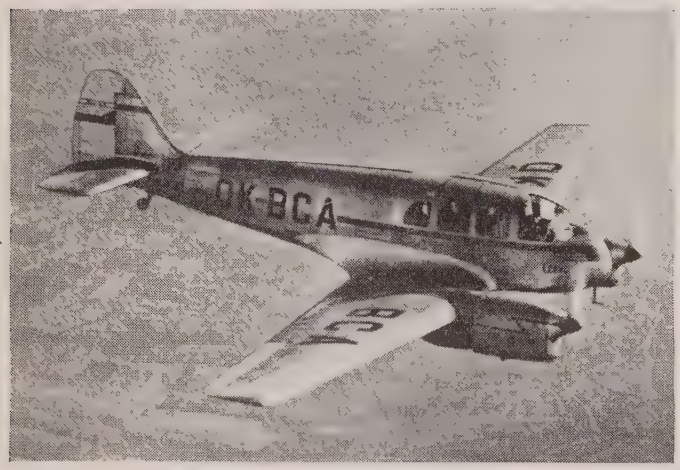
This policy of combining the aviation and automobile industries was meant to help the recovery of the motor industry. Ultimately, it is expected that the three corporations will be combined under one central administration.

The two Czech passenger airlines also have been absorbed into a state monopoly, and all of the prewar aero clubs that dotted Czechoslovakia have now been united in a single network of National Aero clubs. These clubs operate large numbers of sailplanes such as the Zlin 24 and 25, the Krajanek and Sohaj, as well as several two-place lightplanes, trainers.

ZLIN 281 is powered by 106-hp Zlin Toma engine. It seats two side-by-side and has a cruising speed of 118 mph



PRAGA E 211 is a four-place tourist or taxi plane. It is a pusher type that cruises at 137 mph on its 212 hp



AERO 45 is another four-place Czech plane. This one is powered by two Walter Minor engines of 106 hp each. It cruises at 155 mph and is reported to have a useful load of nearly half a ton. It is an all-metal ship

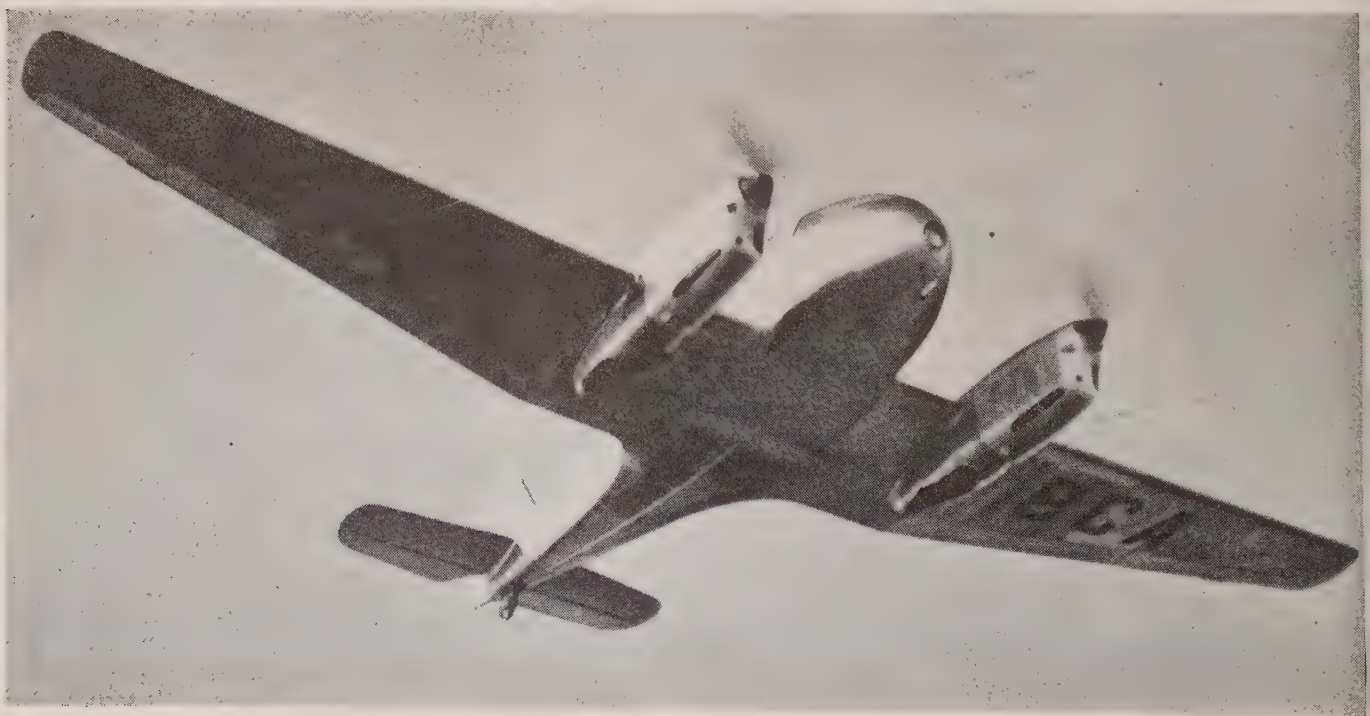
Prior to World War II, the Czechs were successful in maintaining the efficiency of their nationalized banks and railways by compelling each to be an independent, self-supporting and an unsubsidized unit. This policy seems to have worked well, for they have succeeded in keeping the administration progressive as well as efficient.

Rather surprisingly, the mingling of the car and aero industries does not seem to have retarded either the development of new aircraft designs or the production and quality of those already established.

During the period of German domination, a few new aircraft designs were under development, but none of them got beyond the secret blueprint stage. After the liberation, work was continued on these designs. Today, while these and newer projects are being completed, the Czech aircraft industry is producing several aircraft of German design and using German-designed engines. As the newer designs progress, however, change-over to their production will be made smoothly, thus assuring the Czech aircraft industry of continuous production.

At the present time there are somewhere between 80 and 100 thousand workers employed in the aircraft industry. Under present conditions in Czechoslovakia, no firm can employ more than 50 workers and still remain a privately owned company. As soon as there are more than 50 employed, that firm becomes nationalized.

The Czechs are, of course, an intensely patriotic people, and they still both hate and fear their powerful neighbors. As a result, the air-



craft of basic German design are referred to by numbers and letters, not by German name.

The Me-109, renamed the C-10, and the Me-262 are still in use as military aircraft. The Avia factory, under the National scheme known as the Cakovice Plant, still has the Me-262 in limited production. The Junkers 290 is built by the Rudy Letov factory (now known as Letnany Plant), and is called the L-290 "Orel" (Eagle). The Siebel 204D is produced as the C-103.

Further examples of the German influence are shown in the Avia-built Fa-223 and the Zlin 22. The Fa-223 is the large twin-rotor Focke-Aghelis helicopter which completed its test flights rather recently, and the Zlin 22 is really the Bucker Br-181 "Bestmann," a trainer or lightplane.

In the postwar field, the first all-metal Czech plane to be built was the four-place Aero 45. Powered by two Walter "Minor" engines of 106-hp each, the Aero 45 cruises at 155 mph and has a useful load of nearly half a ton. Its fuel consumption is re- (*Continued on page 59*)

SOKOL M-1C is a cabin air-cruiser that seats three and has a cruising speed of 132 mph. Its range is said to be about 620 miles. This Sokol (Falcon) is one of best liked personal planes in Europe. Two-place version is trainer

"I thought YOU had it!"

DILBERT

By Seth Warner and Robert C. Osborn

Crystal-Clear Cockpit Commands—Misunderstood cockpit signals continue to cause accidents of the worst kind—worst kind, because they are entirely unnecessary. Examples:

1. The pilot of a heavily loaded airplane motioned to the copilot to help pull back on the yoke to get the plane airborne. The copilot mistook the motion as a signal to raise the landing gear, which he did. This simple misunderstanding resulted in a major overhaul.

2. Just before becoming airborne, the copilot closed the engine cowl flaps. Immediately thereafter, the pilot reached forward to do the same thing. The copilot, thinking the pilot was attempting to raise the landing gear, beat him to it. Result, same as above.

3. While boiling down the runway, an exuberant pilot yelled, "Pull up the fences; here we come!" Due to cockpit noises, the copilot only caught the words "pull up." That's what he did—to the landing gear—with the usual result.

This asinine type of accident is always the pilot's fault, no matter who misunderstood whom. It's up to the pilot to insure that this can't happen, by proper indoctrination.

In the first place, cockpit conversation during landings, take-offs, and other critical periods should be limited strictly to commands and necessary operating instructions. See Case 3.

Next, the pilot should enunciate distinctly, facing the copilot for the second it takes to give the command. Give the name of the control to be operated first, followed by the action to be taken, as: "Gear-Down", "Flaps-Up", etc. Whenever possible, commands should be accompanied by standardized hand signals. Hand signals alone, however, may be dangerous, for they may be made unwittingly while operating controls. *(Continued on page 62)*

"Gear up, if you please!"

CAOA REPORT . . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminatory legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. The CAOA headquarters are located at 444 Madison Avenue, New York 22, N. Y.

New VFH

The Civil Aeronautics Administration has informed us that very soon private pilots and pilots of corporate planes in the light-plane category will be able to purchase low-cost VHF navigation receivers.

Present production plans of the National Aeronautical Corporation of Ambler, Pa., the company under contract with the CAA, call for a retail sale of VHF equipment at about $400. Installation, antenna and taxes will amount to less than $100, thus bringing the total cost of VHF equipment to something under $500. This is about one-fourth the cost of present-day omni-range receivers.

These VHF receivers being developed will allow flyers to navigate visually, using indications from the new CAA-developed omni-directional radio ranges soon to become standard airway equipment throughout the U. S. These sets also will receive VHF communications from the ground, and will get localizer indications of the CAA Instrument Landing System.

Aircraft manufacturers planning to include this VHF equipment as standard on their aircraft will be able to purchase the sets at much lower than the list price.

Friend-of-the-pilot State

THE STATE OF COLORADO is working out a plan with Western Union Telegraph Company whereby pilots who want to close a flight plan may do so by sending a "Travelgram" for a very nominal fee.

With the "Travelgram" plan in operation, a pilot could wire only the word "Arrived" and his name back to the point of departure. The charge is very little.

*Lights: Number One Essential**

For years, both on and off the record, airline pilots have consistently pleaded, "Give us adequate approach and runway lights."

It has been a matter of somewhat caustic humor that the first landing aid to be invented has been one of the most latent in being developed, namely, Thomas Edison's incandescent lamp.

Ask any pilot what he wants most in the way of landing aids, and his answer will be lights—lights on the runway and lights to guide his approach. The basic reason behind the pilots' placing lights at the top of the landing aids list is that all the systems in the world to bring a plane within landing distance of the runway don't mean a thing if the pilot can't see to land when he gets there. The answer is lights first, with supplementary landing aids (GCA, ILS, etc.) to bring the plane down to the lights.

Pilots would like a double row of approach and runway lights, if they could get them; but in the interest of economy they would be satisfied with single-row approach lights.

One of the most active experiments in runway and approach lighting is presently being carried on at the CAA Technical Development Experimental Station at Indianapolis, Indiana. This experimentation is with double-row lighting. This series of four photographs show night views of the experimental high intensity Slope Line Approach light system recently installed at the southwest end of the NE-SW instrument runway at the Weir Cook Airport at Indianapolis.

The lighting units present a characteristic pattern when viewed from various positions. Advocates of this system advance the opinion that by means of these patterns a pilot with only a minimum of experience in flying this system will be able to estimate his relative position correctly from observation of as few as two pairs of lighting units. As far as is known, this is not true of any other high intensity approach light system now being tested in this country.

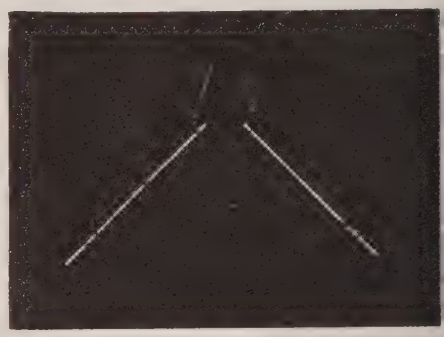
There is a range of five brightness levels at which the lights can be operated, and at the brightest level it should be possible to see them from approximately one-quarter mile during a night-time visibility condition of one-sixteenth mile, or, from about three-sixteenths mile during a daytime visibility condition of one-sixteenth mile.

This installation, although similar to the one now undergoing severe service tests at Arcata, California, makes use of smaller lamps. It is believed, however, that the Indianapolis installation is sufficiently bright for the fogs encountered at most airports.

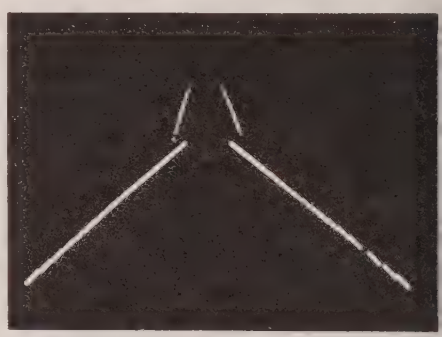
Airline pilots have been invited to inspect and fly the Indianapolis installation at their convenience, and CAOA pilots, similarly, are invited to Weir Cook Airport to look over the set-up. As the lights are operated from the CAA control tower, it is necessary only to request the tower to turn on whenever interested pilots are in the vicinity of Weir Cook Airport. The lights are bright enough so that the pattern can be observed by day as well as by night.

*(*Reprinted courtesy Air Line Pilots Assn.)*

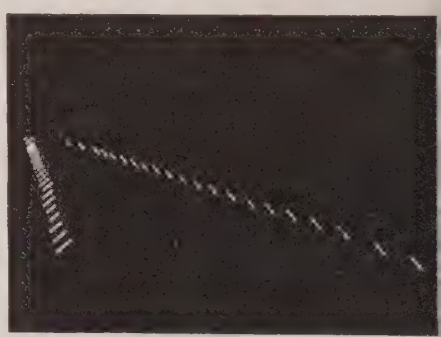
TO PILOT on course and on glide path, the pattern of lights looks like this



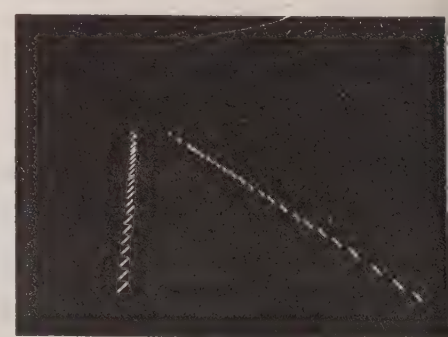
ON COURSE but below the glide path, the lights assume this pattern to the pilot



TO LEFT and below the glide path, this is what the lights look like to the pilot



TO LEFT and above the glide path, the pattern looks like this to the pilot



Big an' Mighty

(Continued from page 16)

fter the plane touches the ground, we everse the pusher propellers which act as rakes for the weighty plane.

You've heard the expression, "as big as house." Well, the B-36 is as big as *three* verage-size houses. Its volume is nearly 8,000 cubic feet. Its bomb bay volume lone is equal to that of four railroad reight cars. Designed to carry 10,000 ounds of bombs a distance of 10,000 iles, the "flying arsenal" has hauled as nuch as 72,000 pounds of bombs at shorter anges. It can do the bombardment work f 15 B-17 *Flying Fortresses,* the type of omber that was instrumental in bombing Berlin during the war.

The B-36 has a design gross weight of 78,000 pounds (139 tons), but on one f our 6,000-mile test missions, it took off vith a gross weight exceeding 300,000 ounds—the heaviest load ever lifted by n airplane.

Our biggest and the world's biggest omber rests on a tricycle landing gear onsisting of a four-wheel, dual tandem ain landing gear and a dual nose wheel. Vith this type of landing gear, weight of he aircraft is distributed over a greater rea, thus permitting use of the plane on he larger runways that exist today. The ires are 56-inch extra high-pressure type.

When we received the first test models f the B-36, they used single main wheels, 10 inches in diameter and each weighing ,500 pounds, instead of the tandem style. Because of the enormous weight the B-36 laced on the single wheels, new runways ad to be constructed for the plane. The pecial runway that was built was 17 nches thick in the center and increased to thickness of 27 inches at the edge of a trip 300 feet wide. This new-type dual-ndem gear eliminates the need for such heavy runway.

I'll bet after all these weighty details ou're wondering how much power it akes to move the Air Force sky giant. Its x Pratt & Whitney, radial air-cooled en-ines, arranged in pusher positions on the ailing edge of the wing, generate as nuch power as 18,000 horses or as much orsepower as five railroad locomotives. Each engine has 28 cylinders and is cap-ble of producing 3,500 horsepower. Later nodels of the B-36, called B-36C, are xpected to be equipped with even more owerful engines—probably advanced nodels of the Pratt and Whitney R-4360 ngine. It takes 336 spark plugs to keep he engines purring.

I have been told by many civilians that he B-36's powerful engines sound more ke an outboard motor boat than the Air orce's mightiest bomber, and it sounds hat way to me, too, when the big plane ies over my office. The engines drive the orld's largest propellers—19-foot-diameter eversible-pitch Curtiss props.

I can't tell you the plane's top speed ecause it's still restricted data, but on everal long test flights we've averaged ore than 300 mph. Its range is in the 0,000-mile vicinity, but the new B-36C expected to have a range of 12,000 miles.

The largest built-in fuel tanks yet de-loped are in the B-36. They carry ap-roximately the same amount of fuel as that of three average railroad tank cars. The fuel in the wing tanks alone is enough to drive an automobile around the world 16 times.

An airplane innovation in the B-36 is its use of alternating current. It also has direct current, but the AC it uses cuts down the weight of electrical equipment to one-fifth of what it would be if only direct current were employed. The total amount of current used in the giant ship would be enough to furnish electricity for a town of 5,000 persons. The plane has 26 miles of wire roaming about its interior.

To make the weight of the mammoth plane as light as possible, the extensive use of magnesium has been employed in the non-structural parts of the plane.

Our B-36 crew consists of 14 men, including four relief members. The plane provides accommodations that no other USAF plane offers—six men can sleep in bunks in the rear pressurized section and hot plates are available for cooking meals and for coffee. Lately, we have been taking the "36" up for 30-hour test flights. Coffee and naps are a necessity on such long hops.

The fore and aft sections of the plane are separated by four huge bomb bays. A subway tunnel more than 85 feet long connects these sections. Crew members can shuttle between the two points by sliding along on a four-wheel scooter that runs down narrow rails through the pressurized tunnel. There are safety catches on the track so men cannot be injured if the plane hits bad air currents and suddenly noses up or down.

Our B-36 crews must operate in perfect coordination. Each man has to know what is happening at every moment. Our flight engineer is probably one of the most overworked men on the plane. He has to be on the alert at his station behind the pilot, and his control panel has hundreds of gadgets that have to be watched. The control cabin itself has thousands of indicators, levers, throttles and other control knobs that would make a newcomer's head swim until he becomes acclimated to the big plane.

It takes a ground crew of about 35 men to maintain the B-36. The plane with its massive mechanisms requires the best of care and plenty of it.

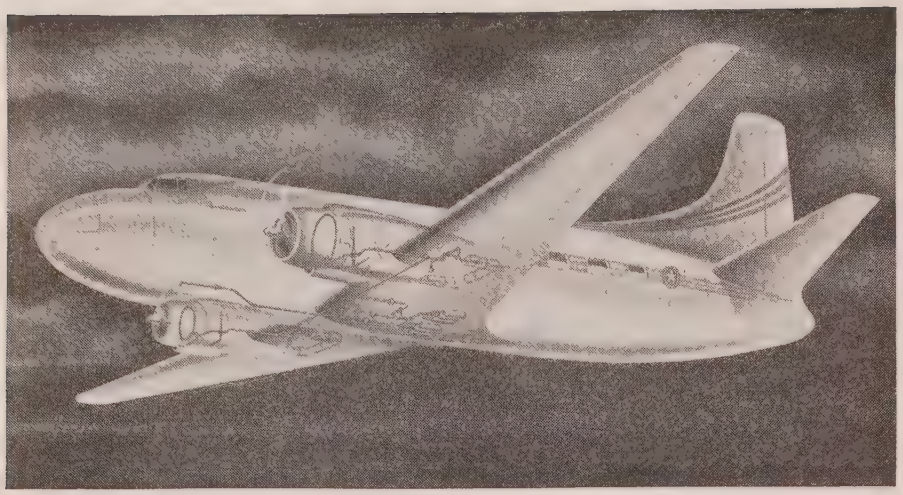
As you can see, the B-36 is one of the greatest accomplishments in the history of aviation. These planes are now coming off the production line in Fort Worth in rapid order. They will certainly be a vital addition to the might of the Air Force.

The B-36 is still undergoing tests and our analysis of data on it has not been completed sufficiently enough to provide a comprehensive evaluation of its actual performance.

We're hoping we don't have to put our B-36's to extensive use in actual warfare. But the big planes are here now and will always be ready to go—with the heaviest bomb loads at the greatest ranges.

GERLACH

"Some day I'll get up nerve enough to fly one of those things!"



FIRE-EXTINGUISHING SYSTEM, as it is installed in the new Martin 202 airliner, is shown in X-ray sketch. This system, developed by Kidde, is electrically operated, uses CO_2

Operational Engineering

Aerial Fire-Extinguishing Systems

THE increasing complexity of all types of aircraft has compounded the problems of fire-protection engineers who — by research, design and application — must eliminate or control fires in the air. Fire requires three ingredients: a fuel supply, air (oxygen) and heat. Separation of any one from the others is an essential of fire prevention; elimination of either of the first two is an essential of fire extinguishment.

Fire-prevention engineering is incorporated in the required standards for aircraft and accessories manufacturing, choice of construction materials and the design and operation of systems which involve the safe separation of highly combustible materials from the dangerous combination of heat and air. The addition of ventilating, supercharging and heating equipment along with new materials in recent years in high-performance aircraft has complicated aerial fire control.

When the built-in safety factors of fire prevention fail in service through deterioration, defect or accident, allowing combustible fluids or materials to be ignited, automatic heat or smoke-detection systems notify the airplane's crew and an integrated fire-extinguishing system, involving methodical fire control, is operated to remove the most flexible of the fire ingredients — air.

U. S. commercial fire-extinguishing systems, design-controlled by Civil Air Regulations, use carbon dioxide as the smothering (air-eliminating) agent because of its great expansion from stored liquid to gas (450 times its stored volume) and because it is non-toxic. Methyl Bromide, with a lower stored pressure, and the resultant lighter weight equipment, is considered a more efficient extinguishing agent. However, because it is highly corrosive and toxic, its use in this country has been restricted to military aircraft. British airliners, however, are equipped with methyl bromide and it is claimed that its use has not resulted in a single passenger fatality in over 15 years of service.

This review will discuss the operation of a typical complete carbon dioxide fire-extinguishing system in one representative type of U. S. commercial airliner — the new Martin 202.

Although the extinguishing apparatus for each type of aircraft is designed and installed according to the needs of the individual type, and at times modified according to the wishes of the commercial users, all must meet the required minimum standards of the CAA and all utilize somewhat similar installations, differing mainly in details and capacities according to the size of the plane. The Martin 202 fire-extinguishing system was constructed by Walter Kidde & Company, Inc., designers and builders of protection systems for over 90 per cent of this country's aircraft.

The main 202 system consists of six high-pressure steel cylinders, each holding 12.6 lbs. of CO_2 (carbon dioxide) charge (514 cu. in. capacity), constituting a two-shot set-up of three cylinders each; one bank of three for the main discharge and the other bank for reserve. Each cylinder is equipped with a one-inch flood valve for releasing the pressure discharge.

The Martin system is operated electrically by means of two solenoid control heads per cylinder bank, with the third cylinder operated by a pressure-control head, the pressure being transmitted through gas interconnectors installed under each solenoid control. The pressure head is used on the third cylinder because there is no need of another heavy and expensive solenoid. A saving is made, not only in weight but in cost.

When, on indication of a fire in a particular section of the aircraft, a main cockpit switch is closed, each of the two solenoid controls in the main bank unseats a pilot check in its corresponding flood valve. This allows pressure to flow through drilled passages in the valve body to a piston which unseats the main check, releasing the entire contents of each cylinder. The third cylinder is simultaneously operated by the action of the released gas flowing through the cylinder interconnectors to its control head. If the proper AN tubing has not been drawn securely to the flood valve outlets or if no tubing has been connected, operation is prevented by a floating nose piece which vents to the atmosphere the gas pressure from the pilot check, thus preventing the actuation of the piston in the main check.

After passing the main check the released charge of carbon dioxide moves to a manifold and then through one line to a 1½-inch double checked tee. The tee connects the main and reserve banks to a common discharge line and includes a check which directs the flow of carbon dioxide from either inlet to the single outlet. It is "checked" to prevent discharge to a bank of empty cylinders.

Solenoid-actuated stop valves are installed in the discharge lines to control the passage of the gas to an indicated fire zone. When the system has been actuated, the carbon dioxide fills the supply tubing up to each stop valve. The Martin system has two 1½-inch stop valves, one for each engine nacelle, and a 1¼-inch stop valve controlling discharge to the cabin-heater installation in the forward fuselage. When the desired solenoid control head is operated, the check within the stop valve is unseated, permitting the full discharge of carbon dioxide to pass through to discharge orifices in the danger zone where it expands to its full gas volume to smother the fire.

Engine nacelles, where fires are most apt to occur due to the multiplicity of various types of system lines carrying combustible fluids close to heat and electrical wiring while being subjected to engine vibration, are separated into three main fire-protection zones. Zone 1 is the main engine section forward of the accessory section, Zone 2 includes the entire accessory section back to the firewall and Zone 3 covers the remainder of the nacelle aft of the firewall. Of the three, Zone 2 is considered the most fire hazardous and receives most of the CO_2 flow.

The Martin nacelle-protection network consists of a perforated ring in the accessory section, dis- *(Continued on page 64)*

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Who Says I Can't Fly

(Continued from page 18)

their carefree pilots were the stuff that dreams were made of for the youngsters of that era. Flying sounded like fun, but a long way off for young Jimmy.

Jimmy turned down his first chance to fly when his father took him out to watch a barnstorming pilot hop passengers in a war-weary *Jenny*. One cylinder bank of the *Jenny's* 90-hp OX-5 was blowing smoke badly, but the $5-per-head passengers flew anyhow. When Jimmy's father asked if he wanted to take a hop, Jim looked up at the long trail of black smoke in the sky and promptly changed his mind. He has carried that same don't-take-a-chance attitude through all his flying.

As if the infantile paralysis wasn't enough, young Mr. Most was riding his motorcycle home from Junior College in the rain when he hit a road grader head on. The motorcycle came out a bad second and Jimmy spent over a year strapped up in braces. Doctors had to patch a broken neck, a right leg had pulled out of joint, a broken arm and a fist full of muscles that had pulled loose from his chest.

"I guess that I always wanted to learn to fly," said Jimmy, "and I came to California to live with an Aunt as soon as I was up and around again. The famed Southland weather meant that one could fly the year 'round, so I went to work at the old Monrovia Airport."

The airport paid this eager 18-year-old in flying time; 30 minutes a week for washing down airplanes, helping the mechanics keep their two old planes in the air and selling passenger rides at 50 cents a hop.

"My very first job," remembered Jimmy," was to pick up a box of nuts and bolts that some mechanic had spilled all over a hangar floor."

Every so often Mr. Most had to take a few days off from his "job" at the airport to earn enough money in town for a new pair of shoes, a haircut or some groceries for his Aunt. The airport changed owners and Jimmy made his first actual cash out of aviation. He sold $60 worth of passenger hops one Sunday and the new owners gave him a $5 bonus.

Seven months after he went to work at the airport; 7 hours and 20 minutes flying time later, Jimmy soloed in an old OX-5 *Travelair*. A large part of his instruction was with private pilots, and no one ever told him to raise himself up with extra cushions so that he could see out over the nose of the plane on landings. Once he cut the throttle and eased back on the stick, Jimmy had to land the plane from what little airport he could see around the edge of the cockpit.

In those days the old private-pilot licenses called for 50 hours in the air. After he had flown over 100 hours, Jimmy finally talked a CAA medical examiner into giving him a special waiver, permitting to take a flight test with a special CAA flight examiner.

"When we climbed out of that old *Travelair,* CAA Inspector Dick Lees said, 'I don't see any reason why you can't fly as well as anyone else.' Boy—I was a very happy fellow!"

To build up his flying time, he worked around the shops and soon qualified for an A & E Mechanics license in the minimum time of two years experience with airplanes. From there he quickly worked his way up to chief mechanic at the Monrovia Airport.

All this time Jimmy was getting time and pilot experience wherever he could. One evening just at dusk he was riding as a passenger on a local hop with a Commercial pilot when a rain squall blew over the airport. The pilot dragged the field downwind in the rain, and when he pulled up to turn in on a landing, the water-soaked magnetos shorted out and the engine quit. The slow-landing *Travelair* came to rest in the top of a huge oak tree, nose down and completely washed out.

"I remember looking back, straight up into the darkening sky, and seeing the pilot looking down at me," said Jimmy.

"This is a heck of a mess," volunteered the pilot.

"It sure is," replied passenger Most as the rain dripped quietly on the crumpled center section. "And I was supposed to be home for an early dinner."

"Maybe you'd better forget dinner at your home" answered the pilot. "We're having squab at my place, so come on over."

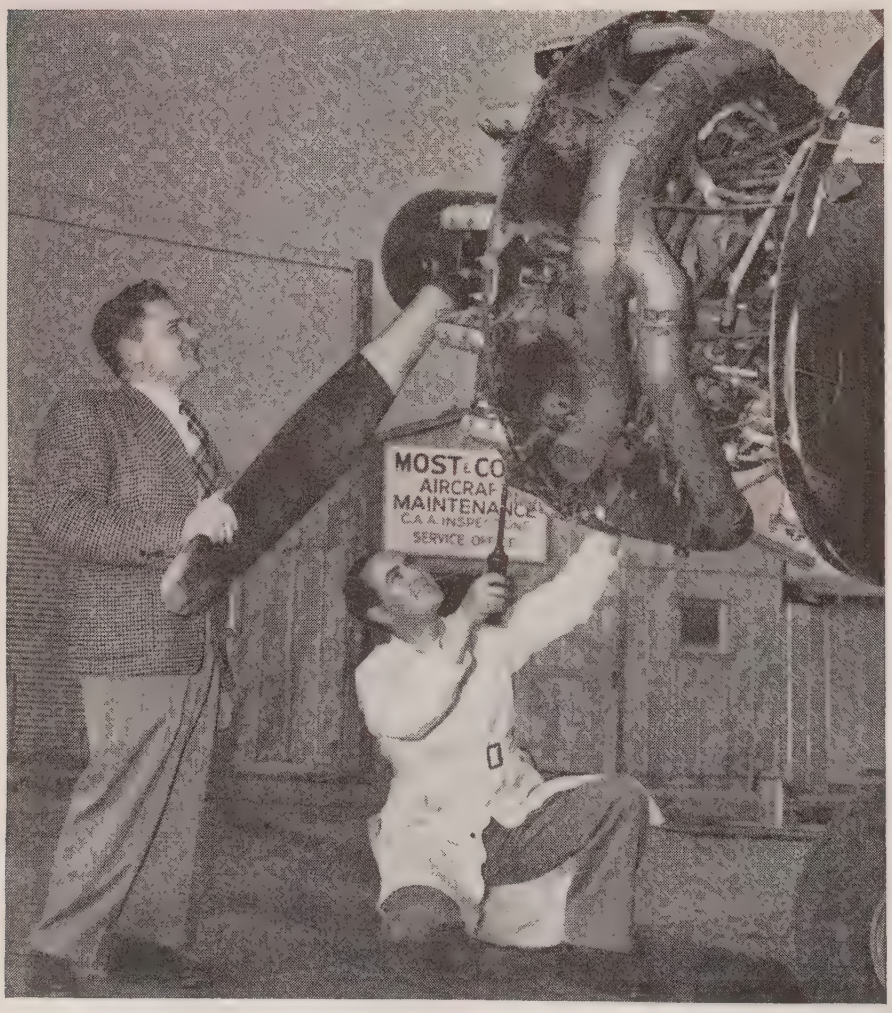
"Then we decided to climb down out of the wreckage," mused Jimmy.

When he had flown 200 hours, Jimmy again ran into trouble with the Flight Surgeons. Each time he applied for his fly-for-hire license, the doctors would find an excuse for not issuing a special permit. Eventually Jimmy was a private pilot with over 600 hours flying before he finally fast-talked himself into a special waiver from the Washington D. C. office of the CAA. Again there was the demand that he take his flight test with a special CAA examiner, and again the young pilot passed on his first attempt.

Now that he could legally hop passengers for hire, Jimmy spent weekends and clear nights flying one-cent-a-pound passengers in a Waco cabin plane from the 2,700-foot down-hill Monrovia Airport. Only a pilot who has flown heavy single-engined planes at night can appreciate just how much flying Jimmy learned in those days.

In quick succession came a flight instructor's rating and a re-rating course at Mines Field in Los Angeles where Jimmy and one other pilot graduated from a class of 10 student instructors. He took a course in Airline Procedures from the Boeing School in Oakland, an acrobatic course at Ryan in San Diego and then returned to the Monrovia Airport as Chief Instructor on one of the first West Coast CPT (Civilian Pilot Training) programs.

Just to prove that it could be done, Jimmy took one of the girl students in an early



PARTNER in operations at East Los Angeles Airport is Lu Cook. Here Jimmy and his partner look over the engine of a twin-engine Cessna in the Most & Cook maintenance shop

CPT course and had her fly a 450-hp Stinson *Reliant.* Since 65-hp Porterfields were used on the CPT program, this was a big jump for any student. After half an hour of quiet instruction in the air, the young lady was able to set down the fast-landing *Stinson* on her first pass at the field. Students thought so highly of Jimmy's ability as an instructor that they tried to arrange for their check rides with him because each check included much quiet, well-informed flight instruction.

"Why, I learned more in a check ride with Jimmy," said one student, "than I did in two hops with my regular instructor."

Shortly after Pearl Harbor, Jimmy completed a flying job at Tucson, Arizona, as chief pilot on a large CPT program and returned to Los Angeles where he applied for a position as a Civilian Flight Instructor for the Army school at Ontario. It was there that the Flight Surgeon told him he was wasting his time and would never fly military planes.

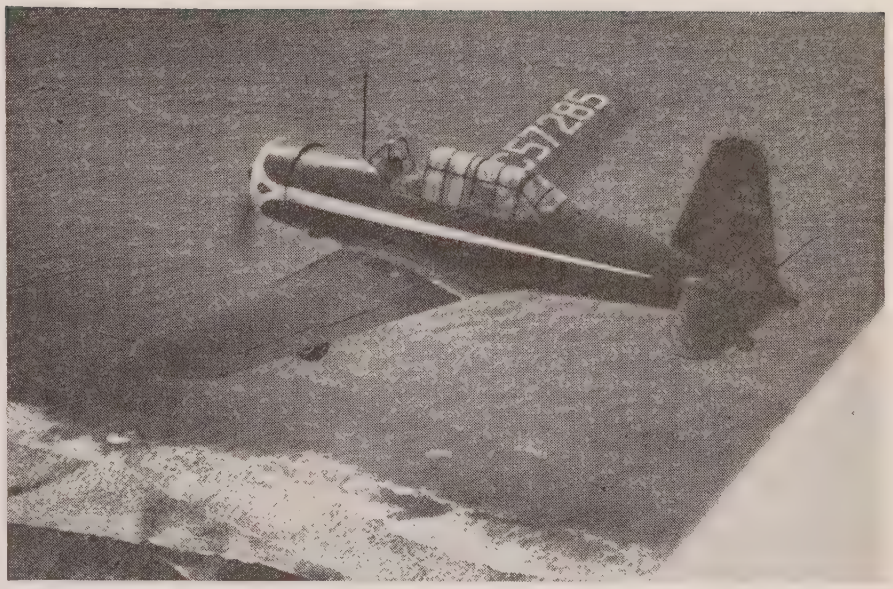
"To tell the truth," said Jimmy, "that Doctor made me more than a little annoyed. I'd been flying long enough to know some of the answers, so I hunted up some good recommendations from friends in the CAA and asked Douglas for a job as a factory production test pilot, taking SBD's up on their first flights.

"First I had to prove to the chief test pilot that I could get into the planes with a parachute on. Then I had to show him that I could reach the rudder pedals once I got in. I had to use three cushions, but the factory was satisfied and put me to work."

For the new two-and-a-half years, Jimmy Most, the handicapped pilot who "would never fly a military airplane," according to an Army Flight Surgeon, flew Army C-47's, A-20's and B-17's as well as Navy SBD *Dauntless* dive bombers.

Production test flying, to listen to Mr. Most tell of it, was a fairly routine job. "The only really hair-raising experience that I had in all that flying took place over downtown Hollywood at 5,000 feet," said Jimmy. "I was solo in an A-20 when the nose section filled up with gas fumes from a broken cabin heater. The fumes ignited and the whole nose section exploded. The bullet-proof windshield saved my face and the radio head-set kept my eardrums from being ruptured by the blast, but I had a brand new pair of trousers that were singed as the flash flames licked into the cockpit before the wind blew them out. The force of the explosion buckled the nose wheel doors and I had a little trouble in getting the gear down when I finally returned to Santa Monica."

On one routine "shake-down" flight, a girl field employee walked casually past the maze of guards on the field at El Segundo and climbed into the back cockpit of an SBD that Jimmy was warming up. With his head down in the cockpit, checking fuel transfer valves, the pilot did not notice his unwelcome passenger, and it was only as he taxied out for take-off that the control tower advised him by radio that he had someone in the back seat. When he taxied back to the flight line, a detail of plant guards and FBI men removed the girl who said she had just wanted a ride.



PILOT MOST and Mrs. Most do a lot of flying together. This photo of the Mosts was taken en route to Ensenada, Mexico, on a week-end breakfast flight. Plane is surplus BT

"And I was going to do English bunts (half outside loops) on that flight," said Jimmy. "She'd have gone through the top of the canopy for sure."

When the war ended, Jimmy and Earl "Salty" Bacon, another factory test pilot, set up a surplus-plane conversion shop at the old Alhambra Airport. This project grew out of ideas talked over between test flights when the heavy Pacific fog cut down flying activities. Their shop did CAA licensing on surplus PT's, BT's AT-6's, twin-engined Cessnas and executive Lockheed *Lodestars.*

Jimmy attended a surplus aircraft sale in Augusta, Georgia, and purchased a Lockheed C-60 for a construction company. After flying the big twin-engined transport solo from Augusta to Washington D. C., he picked up a CAA inspector who wanted a ride to the West Coast, to act as co-pilot. The war-weary transport was not in the best of mechanical condition and one engine leaked oil badly. Fifty miles east of Palm Springs, California, the left engine ran out of oil and Jimmy had to feather the propeller. At that time Palm Springs was still a C-47 transition school and the traffic pattern was loaded with transports. Since the left engine on the *Lodestar* was inoperative, Jimmy requested permission to fly a reverse traffic pattern and land out of a right-hand turn. In that way he would not risk making a turn close to the ground toward his dead engine. Traffic was finally cleared away and the *Lodestar* landed safely after skimming nearby hills on its unconventional approach.

When surplus conversion jobs became fewer and farther between, Jimmy moved to the East Los Angeles Airport where he set up a sales, service, flight instruction and charter service. He now has 18 employees on the pay roll.

When he flies his wife and two daughters to visit his parents on weekends, he lands on their little dirt "airport" in the corner of an alfalfa patch near Victorville, California. This landing strip was made in one day with two tractors, and cuts down the travel time to his parents' ranch from 3 hours by auto to 30 minutes by plane.

Jimmy has the greatest respect for his flying equipment. His years as an A&E mechanic, working on old prewar planes, taught him that if it isn't right, don't fly it. Forced landings caused by balky engines just don't happen at Jimmy's field. This same attitude carries over to the flight line where G. I. students are taught that an airplane is just another safe way to travel, not a machine for thrill-seeking pilots to abuse. Each plane has a sign on the instrument panel: "Any pilot doing unauthorized acrobatics in this aircraft will be terminated (washed out)!"

Jimmy is now a CAA flight examiner. "When I give a flight test for a private license," says Jimmy, "I'm much more concerned whether the pilot has good judgement in the air than whether or not he can shoot three perfect spot landings in a row. I want to know that he can fly well enough for me to have my wife or my daughter go up as his passengers. If he can, he gets the license. If he can't he gets more dual instruction."

Frequently Jimmy is caught napping about his handicaps. When admiring pilots comment on his smooth flying "in spite of his handicaps," Jimmy is amazed. "I don't think of myself as being handicapped. I've been broken up a bit here and there, but I get around all right. I can't understand why other people are so surprised that I can fly. It's much easier for me than driving a car."

Jimmy has flown over 4,500 hours in the past 15 years. He holds all the pilot ratings there are and has never scratched an airplane except during one forced landing on a course where he deliberately ground-looped a *Travelair* to keep out of a sand trap. He broke one shock absorber and skinned the paint on one wingtip. Few pilots can equal the safety record of this cheerful little guy who grins up at the biggest of airplanes—and then flies them as they should be flown.

"Even serious physical handicaps won't keep anyone from becoming a pilot," says Jimmy. "Anyone, that is, who *really* wants to fly."

OVER-WATER emergency equipment was important item on ferry trip to Brazil. Here Johnny and Ruth check over a Mae West in a war surplus store. Each pilot wore one on trip

Destination . . . Brazil

(Continued from page 22)

to our arrangements with the Beech Aircraft people.

Alternate routes were chosen for the flight—one followed the land bridge that connects the two continents, while the other followed the Caribbean island chain, crossing from Trinidad to the mainland of South America. The island chain route was finally selected for several reasons, chief of which was weather. Summer and early fall flying over the land route is often made hazardous by sudden and violent storms. The water route, on the other hand, finds daily but predictable cumulus in the afternoon, usually preceded by relatively smooth flying. Too, the group of us felt that by flying over the U. S. to Miami there would be ample flying time to show up any possible weak spots in the ships—weak spots that could be better corrected by service operators within the continental United States than in Mexico which, by the other route, would have been just a day's flight from Wichita.

Finally, in September, everything was set and the four of us met in Wichita at the Beech factory. Company pilots checked us out in the *Bonanzas* and soon we were on our way. First stop . . . Miami. Not until we reached Wichita did we discover that instead of four *Bonanzas* for S. A., there were only three. We solved that by designating the fourth pilot as navigator and relief, with each of us taking turns at being #4.

Shortly after leaving Wichita, reports of a hurricane off Florida began coming in over the radio. Having some 7,000 miles to fly after reaching Miami, we quickly decided to make Tallahassee our first destination. We sat out the bad weather and winds there, finally making Miami several days later.

We busied ourselves in Miami for a few more days getting final landing permits, etc., for each port of call where permits were necessary. These permits ranged in price from $23.95 for Haiti, to $36 for Cuba . . . all this exclusive of cable costs, etc. However, as we found along our route, those charges were only the beginning.

The 7,000-mile route that lay ahead of us included flying over sea and jungle, a trip which was to take us across the Tropic of Capricorn, through the Windward Passage, down to and across the Equator. Charted, our ferry trip was this:

Miami to Camaguey, Cuba.....340 miles
(Clear customs . . . Overnight stop)
Camaguey to Port-au-Prince.....411 miles
(Clear customs)
Haiti to San Juan, Puerto Rico, 402 miles
(Customs . . . Overnight stop)
P.R. to Antigua, B.W.I.....300 miles
(U.S. Base, no customs. Overnight stop)
Antigua to St. Lucia, B.W.I.....240 miles
(U.S. Base, no customs)
St. Lucia to Trinidad.....225 miles
(Customs . . . Overnight stop)
Trinidad to Georgetown,
Br. Guiana.....350 miles
(U.S. Base, no customs)
Br. G. to Zandery, Surinam.....222 miles
(U.S. Base, customs except Sun.)
(Closing down. Overnight stop)
Surinam to Rochambeau,
Fr. Guiana.....199 miles
(U.S. Base to be returned French Gov't)
French Guiana to Belem, Brazil, 506 miles
(Customs and then some! Overnight stop)
Belem to Sao Luiz.....305 miles
(No customs . . . Overnight stop)
Sao Luiz to Fortaleza.....402 miles
(Customs . . . Overnight stop)
Fortaleza to Recife.....426 miles
(Customs . . . Overnight stop)
Recife to Bahia.....400 miles
(No customs . . . Overnight stop)
Bahia to Vitoria.....520 miles
(No customs)
Vitoria to Rio.....288 miles
(Customs and then some!)

Probably the greatest annoyance of the whole trip was having to constantly face palms up for graft. We'd been warned about this and had expected to run into it here and there, but not as constantly as we did. After paying the no-small-sum of $36 for the privilege of landing in Cuba, it wasn't easy to have to hand out an additional $7.50 per plane for a landing fee at the airport, plus another $20 per plane for overnight parking!

Eventually we learned that by dickering and bickering you could occasionally beat down the graft attempts, but we'd each lost quite a hunk of money by the time we'd made that discovery. Certainly the entire procedure didn't add to any "I'll be back someday" hopefulness.

You can be sure that on our next trip to South America we'll go to the places of the least graft, the greatest service and the most courtesy. What's more we'll be quick to advise those who ask us where to and where *not* to go in South America!

The places we recommend for a visit by touring airmen are Haiti, Puerto Rico, stops on British soil and, of course, the U.S. bases, and Surinam.

Along our route, accommodations were for the most part adequate. Some were more than adequate, but . . . only a few of them. Hotels definitely were not up to the commonly accepted U.S.A. standards, and most of the overnight billets we "enjoyed" were at hotels. At Antigua, we were bunked at a place reserved for visiting generals, and at Surinam home was a small frame cottage built on the edge of the airport's taxi apron. It was thrown open to us by the simple device of opening its shutters.

The importance of fuel to a plane is probably only exceeded by the importance of food for the pilots. On this trip we all ate as pilots usually do on cross-countries . . . haphazardly. Early morning take-off, which meant we had to get up at 4:30 a.m., almost always resulted in our having to go without breakfast. There were no airport cafes worthy of naming. Clearing customs and then getting into town was always a slow and tedious affair, so lunch was almost always late in the afternoon.

Dinner, however, ran the gamut of either being worse than nothing to eat or really superb. At Madam Gare's in Belem, dinner was a snatch-what-you-can meal; at a restaurant that was called "Puerto Rico's oldest" the food tasted as though it had been on hand since the grand opening; in Sao Luiz, the hotel food was so bad it provoked editorials in the local newspaper. We were lucky here, though, and enjoyed a wonderful dinner at the home of the American Consul and his family. The one restaurant that proved worthy of its reputation was in Recife. Called Leite's, the dinner served there was something to be recalled for the benefit of grandchildren.

To put it mildly . . . trip costs were high. Gasoline varied in price from 36 cents a gallon in one place to 50 cents a gallon in another, and at one airport they offered

to us for $1 a gallon. We thanked them
ıd left without buying. Landing fees
ıd to be paid at each stop, and these
nged from $3 per plane on U.S. bases
the already mentioned $7.50 in Cuba.
Transportation from airfield to town was
ailable at every stop except Rochambeau
o Cayenne) and Zandery (to Parama-
o). But the cities or towns were often
) miles or more from the airports, and
e taxi rates were high.

Overnight accommodations cost us $1
r person at the U. S. bases, and as much
$7.50 a person in hotels. These prices
rely are proof that a flight to South
merica is something of no small financial
oportions.

As far as the plane itself was concerned
e three Beech *Bonanzas* proved to be
eal for such a trip. They are fast and,
ith auxiliary fuel tanks in the luggage
mpartment, have excellent range. Me-
anically the ships were very dependable,
much so that we were able to relax and
ally enjoy the flying. Actually, the only
echanical difficulties we experienced
ere a sticking starter solenoid, the loss of
draulic fluid through a loose fitting on a
ake, and the loss of antenna cones. We
ft a string of antenna cones all along
r route.

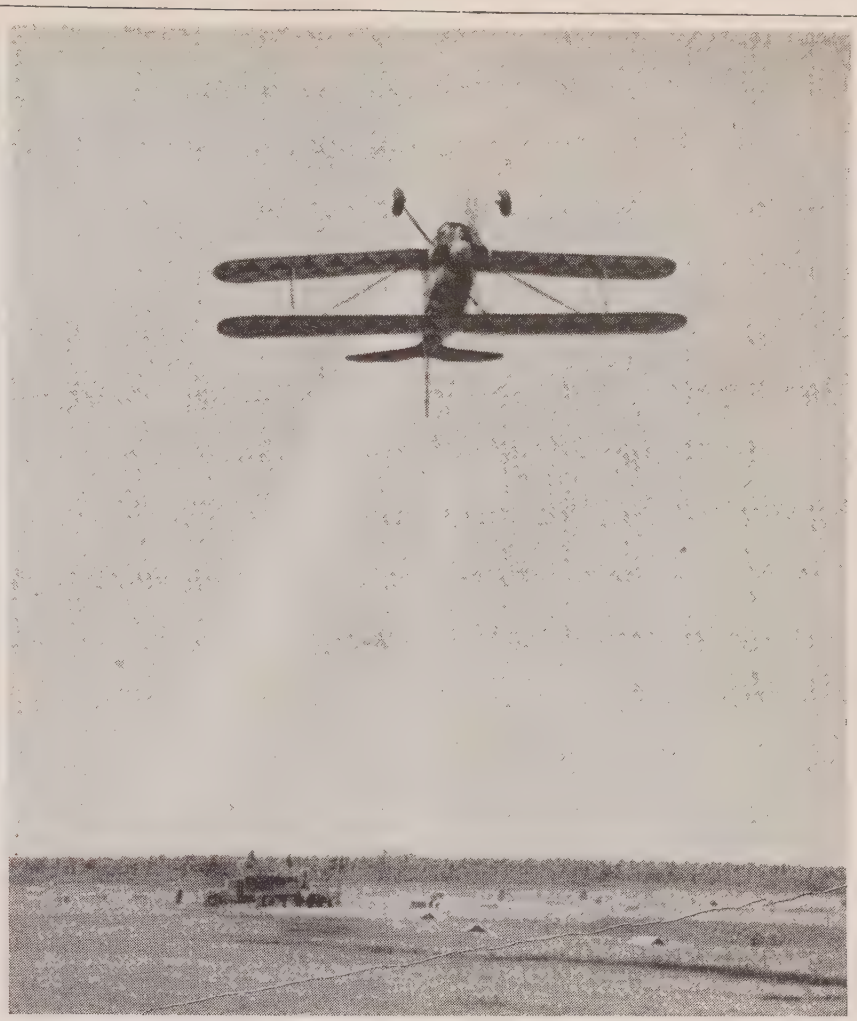
Contrary to alarmist reports that we
ard before we made the trip, the ferry
ip to South America was very simple.
ne "danger" of over-water flying proved
n-existent. Navigation over water was
sy . . . we used radio checks plus dead
ckoning plus a growing knowledge of
w to read wind shifts and cloud forms
er water.

The weather problem was negligible,
ssibly because the four of us, being
d rather than bold pilots, had long since
arned to listen to the local weather Joes
hen in strange territory.

The over-water flying proved a new and
mpletely enjoyable experience to the
ree of us who'd not experienced it be-
re. The coastline flying down the rim of
uth America, however, proved boring
the extreme. The mainland remained
dden under constant clouds most of the
ay, and when those clouds did lift all we
w was jungle, jungle . . . and more jun-
e, backed by mountains in the interior.
There was, of course, the ever-present
ssibility that an engine would quit. We
ere as well prepared for this, however,
we could be, having with us Mae West
e preservers, one-man life rafts, jungle
cks, signaling mirrors, Very pistols
d medicines. As further security, we all
w within easy sight of each other so
at in the event of a forced landing, our
sition could be noted and the wings of
scue set immediately in motion via radio.
r-sea rescue is no new thing to the peo-
e who live along that air route.

Our arrival, finally, in Rio de Janeiro
ade the inconveniences of the trip almost
de from memory. Happily, we delivered
e *Bonanzas,* shining and intact, to the
stributor.

A few days later, we headed back to
e U.S.A. via commercial airliner. As
ch fun as it was making the trip down,
was more fun getting back home again
. where it's safe to eat raw vegetables
d a glass of water doesn't have to be
ndled with rubber gloves and disin-
ctant.



INVERTED RUNS in Fischer's stunt ship are crowd-thrillers wherever youthful 22-year-old pilot performs. Ship has inverted fuel system

Custom-Built Stunter

AVIATION enthusiasts in the Middle West probably will recognize both the airplane, as pictured here, and the young man who flies it, for the scuttlebutt from that section reports he's a popular air show performer. The airplane is a custom-built Rose-Parrakeet, recently modified and restressed for aerobatics. It has a wing span of 18 feet, is 14 feet long and weighs only 503 pounds. It is powered by an 85-hp Continental engine, has a rate of climb of almost 200 fpm, and has a cruising speed of 125 mph. According to 22-year-old Bill Fischer, its owner and pilot, this little ship will do an outside loop within a circle of 600-feet diameter.

ROSE-PARRAKEET is painted red and white and is "a forgiving airplane"

Arctic Survival

(Continued from page 26)

tempts to combat the chilling, freezing cold . . . or it could mean men with a purpose, having the knowledge of what was necessary to survive until rescue arrived.

To be sure that men forced down under circumstances such as these would have better than a 50-50 chance for survival, the Alaskan Air Command with Headquarters at Fort Richardson, Alaska, organized the Arctic Indoctrination School at Nome, Alaska in November, 1947, headed by an Arctic veteran, Captain Harry Strong and staffed by men who are experts, each in his own field. These men have lived in the outdoors most of their lives and during the recent war learned much about the use of modern equipment. Natives are also utilized for their inherent abilities, having a knowledge that has been passed on by generations of their forebears. The combination, white and native, under the leadership of Captain Strong, makes an efficient school staff.

The Arctic Indoctrination School handles 60 students per week during the winter months. The students are officers and enlisted men, whole flight crews and members of flight crews drawn from bases scattered throughout Alaska.

When the student arrives at the Arctic Indoctrination School, he finds the campus a wind-swept plain of frozen tundra and the bleak ice pack of the Bering Sea. The countryside around Nome is an ideal location. Nome, itself, is built on the barren tundra which rims the entire Arctic. To the west, Cape Rodney lifts its rocky shoulders in much the same manner as do the headlands of the Canadian Polar Archipeligo, the grim buttresses of coastal Greenland and the wind-swept ramparts of Spitzbergen. Off shore lies Sledge Island, a typical polar island. The Polar pack-ice drifting southward in the fall combines with the newly formed ice of the Bering Sea to present a scene that is permanently duplicated in the far northern area that was known as the "Pole of Inaccessibility" before the advent of the aircraft.

These new students are filled with mixed feelings—some are eager, for they are the men who have given thought to what *could* face them upon making a crash landing in the bleak wilderness of the northern Alaskan terrain. Some students are indifferent and show their disregard for the whole proceedings. This picture changes at the end of the one-week course, with the whole class unanimous in wholehearted approval, proud of what they have learned, but hopeful that they will never have to use their new-found knowledge.

The student is given one day of classroom instruction and outdoor demonstration at the Arctic Indoctrination School, and for the most part he listens and practices diligently, for by then he has begun to realize what he will soon be facing.

The next day, the students, wearing snowshoes and carrying 50-pound packs on their backs, move out for the tundra with their instructors. As they move along, the students are on the lookout for conditions which indicate the direction of the prevailing wind, signs of game and pitfalls which abound in the drifted snow. (Men have been known to walk off 20-foot drops because of poor visual definition.) At certain intervals the crews drop out with their instructors at their theoretical "crash-sites." When thus isolated, the airplane commander takes over and delegates various duties to the crew under him. One officer is assigned as quartermaster officer, responsible for the storage and issuance of rations and equipment, and another is assigned as sanitary officer. Although under observation, the men are able to readily visualize their plot as real, for they have already begun a battle against the elements. In the construction of their shelters and in organizing the myriad of details so necessary for survival, the cold is always very near and very apparent.

If a student so much as removes a glove to perform some task, his hands are quickly nipped by the cold. The men are careful to observe the cardinal rules laid down—keep dry and prevent excess perspiration—do not waste energy in violent exercise—allow no body surface to become exposed.

Some shelters can be seen dotting the surrounding countryside and as dusk falls the fires of the camps may be seen winking in the near dark. Although the students are not aware of it, they are under almost continual observation from the school headquarters where the commandant and key personnel with powerful field glasses observe from a glassed tower. As an additional precaution, each group is equipped with a walkie-talkie radio to be used in case of an emergency. The Alaskan Air Command takes no unnecessary risks with its men in the cold Arctic winter. By the end of the first night the men have begun to accept some of the statements they have had drilled into them. They know of the remarkable insulating qualities of snow and that it is far better to burrow beneath the snow in case of a sudden blizzard than to remain on top in a sleeping bag. They have found that the warmth of a small candle inside a shelter will raise the temperature enough to permit the removal of outer garments. Already they appreciate the value of the emergency kits and rations supplied in all their aircraft, and know that these rations and kits, although adequate, must be used sparingly.

During their stay on the tundra the men have constructed typical tundra shelters suitable for barren wind and snow-swept terrain. Utilizing the equivalent of parachutes the men have laced together the wiry branches of the Arctic scrub willow to form the skeleton for their shelters, with the entrance appropriately placed away from the prevailing winds. (Soundly underscored by a few unwary students.) Many innovations are used such as utilizing string and wire from the kits to bind the branches into a skeleton structure—placing the hut so as to take advantage of additional protection from nearby heavy accumulation of undergrowth.

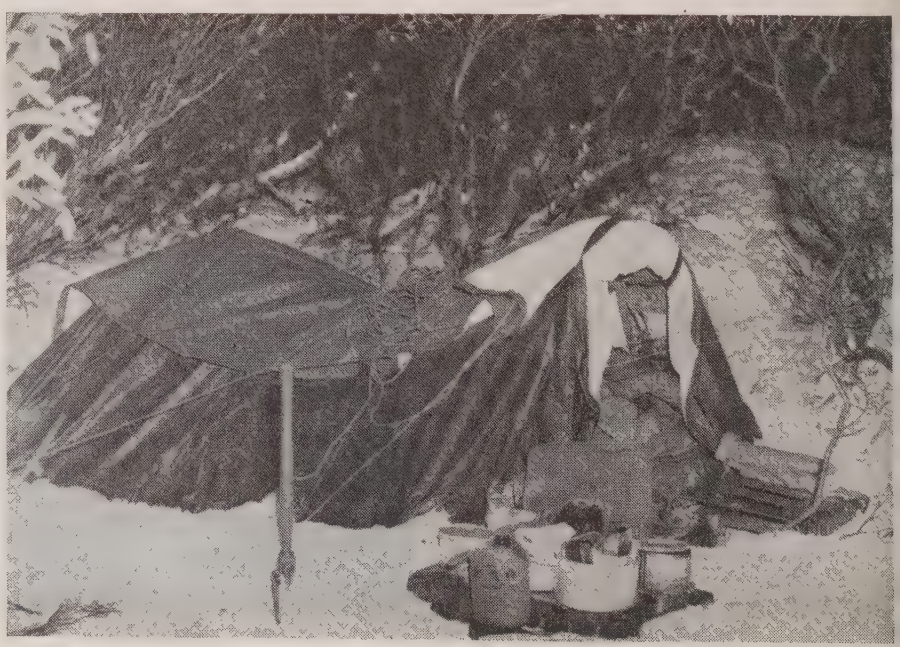
The fare on the tundra consists of parachute rations, a concentration of energy in a small package . . . cheese, crackers, candy, gum, bouillon cubes and cigarettes —articles that although not filling contain sufficient energy to carry the men along until rescued.

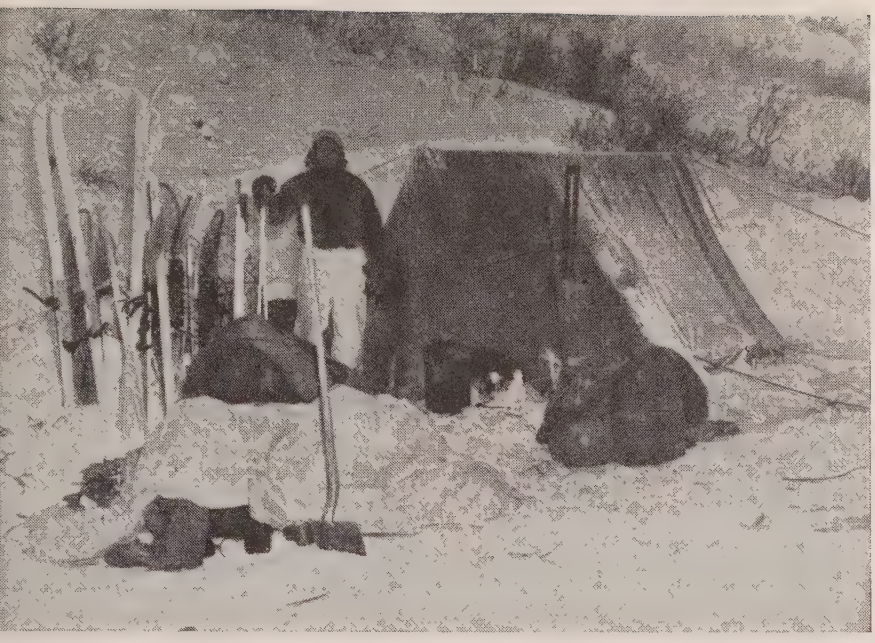
Upon their return from the first phase of the school, the "tundra exercise," they already possess certain knowledge that may someday save a life—knowledge that will allow them to assume command of a panic-stricken crew and bring about order.

Back at the Indoctrination School headquarters the men hold a critique. The discussion is carefully handled by the commandant and the men are drawn out in detail on their experiences. In this way any possible flaws in the school methods are exposed and many worthwhile ideas are brought out.

Because much of the flying done in Alaska is over waters such as the Bering Sea, the route along the Aleutian Islands or the far reaches of the Arctic Ocean, the Alaskan Air Command devotes the second portion of the course to survival on

TUNDRA SHELTER, called "well-planned" by School officers, is a low-tent reinforced with snow shoes and willow branches. Part of student's equipment is shown on the rack





IEADQUARTERS for search for survivors of B-29 crash in Arctic was this camp set up three iiles from wreckage. Capt. Harry L. Strong (above) played prominent part in the search

n ice pack. Preparing for this trip the udents are again carefully briefed, for is type of "survival study" is entirely ifferent from the tundra phase. They arn by observation how to construct a ow cave on ice which is heavily drifted ith snow; how to build an ice house, igloo to the tenderfoot or cheechako) nd how to fish through the ice with a arbless hook and line so as not to wet e gloves. The native, utilizing this ethod, uses two poles with the line at- ched to one. Upon snagging a fish he eaves the poles across the line until the sh is out of water. Then with a simple ake the fish is dropped from the barb- ss hook to the ice and the line slides own the poles and into the water with e wearer still having dry mittens. They arn of the prime danger of any emer- ency shelter, carbon monoxide, a by- roduct of oil-type fires, and how to pre- nt accumulation within the shelter. The en learn that their fare will consist of eld ration "C", a much more filling item an the parachute rations.

When the class reaches the ice, they gain split up into small groups or crews. he construction of snow and ice shelters the first job. The students by now know the superiority of the saw over the axe knife for cutting snow blocks, so neces- ry in the construction of a snow house. hey know the different types of shelter nd the terrain that is best suited for each nd that a saw is much easier for an in- red man to utilize than an axe.

When first confronted with the prospect two days on and near the ice pack of e Bering Sea, the students present an teresting study in mixed emotions. One roup of pilots were enrolled who four ays prior to their "crash" at Nome had een basking peacefully in the warm sun McDill Air Force Base, Florida. This a situation which is peculiar to the mod- rn day Air Force, where the men must ecome accustomed to rapid changes, and ust be able to adjust themselves readily climatic and geographic changes.

Constructing their snow shelters, the men are closely watched and criticized by the instructors and they gain more and more confidence in their abilities. Over-confidence is watched for very carefully and the "'know it all" usually manages to place himself on the receiving end of a backfire of some of his knowledge. One example is the smart fellow who disbelieves the talk about keeping his clothing dry. He disregards the snow that clings to his garments and then, when within the shelter, the snow melts and seeps inside his clothing. When he goes outside again, the moisture freezes and Mr. Know-it-all soon finds it decidely unpleasant to have to get out of his clothes to find icicles.

In constructing a snow cave, a large drift is usually selected and the digging begun. One man must lie prone and shovel the snow with the aid of a small trench shovel while the second man aids by removing the excess snow from behind the man digging. The inside entrance is made small to prevent heat loss, while the entrance tunnel is made slightly larger. The main room is dug high enough to permit the men to sit erect during their meals and before sleeping. Branching out to each side is a sleeping room which is constructed slightly longer than the height of the student. The sides of the snow cave are formed into the shape of a rough arch, this shape being stronger than the conventional square room. There is another purpose, however, for the melting snow inside the shelter runs down the walls rather than dripping on the occupants. This soon results in a sheath of glazed ice which further adds to the insulating qualities. Meals are cooked on a small compact gasoline stove, small enough to fit into a parka pocket. To prevent the accumulation of carbon monoxide, vents are made near floor level.

The men usually have a good chance to check on the construction of their shelters for at night the temperatures drop well below zero, sometimes accompanied by a snow or windstorm. Many mornings when roll call is taken it is discovered that two or three men are missing.

Usually a mound of snow begins to heave and there emerges the missing students, who had been snowed in. It is amusing to watch a student's face when he emerges from a snow cave (after a supposedly rough night) and sees the dog teams that have spent the night in the open, sleeping soundly in a snow bank.

The shelters are inspected by the instructors who point out flaws to the builders . . . flaws such as too large an entrance, an improperly placed vent, straight rather than arched walls and entrance too near the main room rather than extended with a tunnel to prevent danger of a cave-in. Finally, the men participate in building snow houses (igloos). They watch as the instructor drives a stake in the ground and attaches a string to draw a rough circle in the snow. Then they begin cutting blocks of snow and placing them on the circle. Each block is properly bevelled on the ends with a saw, the wielder pointing the saw towards the center stake for reference. As the work progresses, the blocks are trimmed to size and pushed into place.

This causes the circle to spiral around and up until there finally remains but one block for the top known as the "keystone block." Its name is derived from the fact that it is the one block that holds the others in place and without it the whole structure would come tumbling down. As soon as a snow house is built, snow is thrown over the whole surface and inside a fire is started to cause the ceiling to ice up and become solid.

Although the Arctic Indoctrination School is designed to train airmen in survival tactics in the Arctic and although the students are very conscientious in their labors, the American sense of humor can not be stifled even in this setting. A common stunt is to build a small ice house approximately five feet in diameter with an entrance at both ends. Then 20 or 30 students line up behind the house out of range of cameras and go through one at a time while their buddies grind away with their movie cameras at the emerging students. It is not uncommon to see a man feeling his oats and walking on top of a drift without snow shoes. One minute he is there and the next he has disappeared. Usually when his investigating buddies begin digging him out, they find the man contentedly laying in the snow awaiting rescue.

The students learn all the techniques of remaining alive until rescue arrives and they also consider the methods which will be used to effect rescue. The 10th Rescue Squadron which is in charge of rescue operations in Alaska is prepared to send its personnel night and day for immediate search and rescue. The 10th Rescue equipment includes everything from varied airplanes to special delivery para-dogs.

Graduates of the school flying long polar reconnaissance missions over the frozen reaches of the North Pole or far from base over the bleak barren lands of the tundra of Alaska may fly with their minds at ease for they know that they can remain alive until the arrival of help from the 10th Rescue Squadron.

U OF I
LIBRARY

Cold Weather Flying

(Continued from page 35)

breath of the occupants. In many cases, particularly during very cold weather, frost on the outside of the windshield will have to be removed manually, and one of the most efficient means of doing this is scraping with a plastic putty knife. Double windshield glass or glass screen section with dead-air space between retards outside frosting; however, it renders useless the benefits of the inside fan. Curved windshields are more prone to frost than flat types.

Preheating Engines

Preheating of engines by the familiar plumber's blowtorch has been done successfully for many years, especially where modern hangar facilities or external heating units employing steam, hot water, or electricity are not available. The engine should be clean and free from oil and fuel leaks. If the drop-skirt type of engine cover is used, best practice is to place the blowtorch slightly forward and at least 3 feet from the bottom of the engine. Frequently an engine cover only is used, with the heater well forward of the engine, heat being conducted to the engine by a slanting stovepipe. This method appears to be a lesser fire hazard; however, a baffle is needed on top of the heat-conducting pipe to prevent heat concentration on the engine. It is difficult for operators of small craft to carry the added equipment.

Probably the greatest of all fire hazards during preheating in excessively cold weather is the simultaneous use of more than one blowtorch. As these heaters are pressure stoves and sometimes go out, especially at low outside temperatures (thereby atomizing raw gasoline within the tent), the explosive vapor thus formed is fired by the lighted blowtorch. Maintain a constant watch at all times, but especially when more than one heater is used. Personnel on guard must sometimes seek warmth within the engine-heating tent. When doing so remember that poisonous carbon monoxide gas is probably present.

Although the "running out" of the carburetor—allowing engine to stop from fuel exhaustion after shutting off fuel—does not entirely exhaust fuel from the carburetor, the fire hazard is minimized by so doing. A filled carburetor may overflow when heated and fuel in the carburetor vaporizes during "fire-potting."

Note that some blowtorches emit sparks of glowing carbon, especially if the heater is jolted. Do not rely on fire-resistant treating of heating-tent skirts. The flame-resistant property deteriorates with age and is none too good at best, especially as the tent becomes oil-soaked. Operation of a heater in a barrel or drum (especially when there is a wind) lessens the fire hazard when a skirt-type engine tent is used. Watch for the slip stream of another aircraft blowing the skirt into flame.

Aside from the obvious fire hazards, there are other dangers. When excessive heat is applied below the engine, there have been instances of the flexible fuel hose to the carburetor deteriorating to the extent of entirely shutting off the fuel supply. Unfortunately, damage may not be noted on the external covering and, furthermore, collapse may not occur until the line has cooled and contracted. Excessive or concentrated heat has "cooked" wire insulation, cylinder flange, and propeller seals, subsequently causing malfunctioning or bad oil leaks.

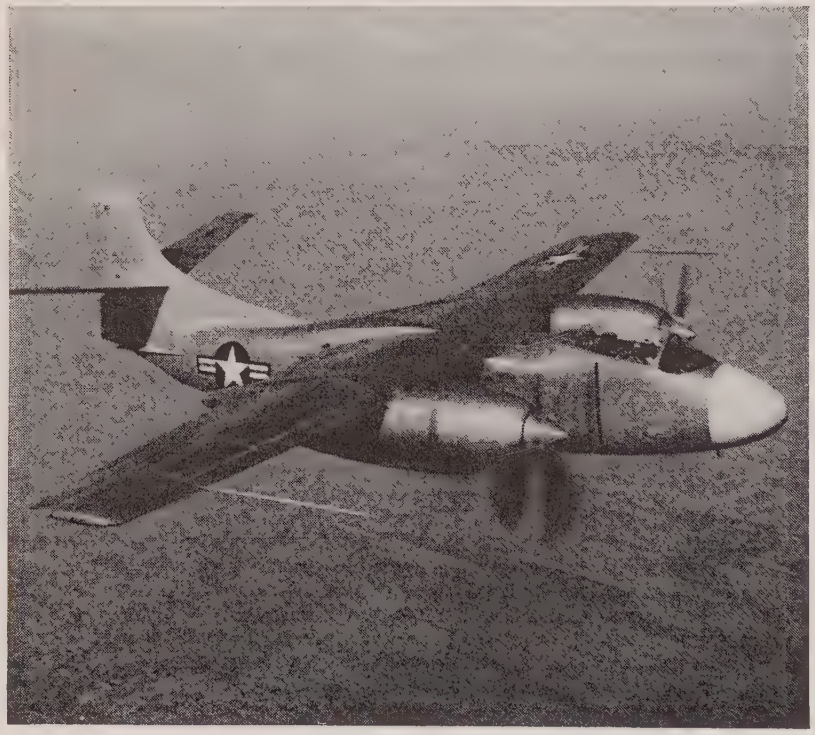
Loss of heat during fire-potting can be prevented by placing folded wing covers or blankets on top of the tented engine. Some pilots use quilting felt or blanket cloth on top of the heating tent. This is effective; however, the stowage of this equipment is prohibitive in small planes.

Engine Priming and Starting

Starting methods vary according to the type of engine and accessories, including various primers. In sub-zero weather the actual starting may not be much different from warm-weather starting, assuming the engine, battery, and lubricating oil supply are at the proper temperature.

In some planes the storage battery is so located as not to be included during the engine preheating. The output of a storage battery may be less than 50 percent if its temperature is sub-zero, consequently a pilot may believe his battery is discharged when only slow heating to 40° F. or less, restores the necessary output to turn the starter. Placing a cold charged battery on a charging circuit restores its efficiency by warming the elements as well as interrupting the sulphation process. Slow heating, however, or keeping in warm place when not in use may also maintain its serviceability. Beware of rapid heating by external means.

As engines during and after starting are more liable to backfire during cold weather, the carburetor heater should be in the "off" or "cold" position when starting, otherwise it may be damaged. Also check the spring-loaded blow-by valve in the air scoop to see that it is not frozen in the closed position.



XAJ-1, designed and built by North American, is powered by two Pratt & Whitney engines, plus one GE-Allison jet in the tail. It carries crew of three

Navy's Newest Carrier Plane

ONE of the newest of the Navy's carrier planes is the North American XAJ-1. Powered by two Pratt & Whitney *Double Wasp* reciprocating engines located under the wings, and one General Electric-Allison turbo-jet engine in the tail, the XAJ-1 is said to be faster and able to carry a heavier bomb load than any of the present carrier types. The plane is heavier than present attack types used in flattop operations, but is lighter than the Navy's P2V which just completed carrier take-off tests. The XAJ-1 carries a crew of three in its pressurized cockpit. Other features of the XAJ-1 include a tricycle landing gear and folding wing and tail sections. The outer wing panels of the XAJ-1 fold inboard and the vertical tail section folds horizontally to facilitate deck handling.

Check the manufacturer's specification inst your own experiments as to the rect rpm for beginning warm-up. At low rpm the engine may "load up" or buretor may not perform properly caus- engine continually to "pop back." Too h an rpm warms the engine too quickly l may rupture an oil-scavenging line or nection. On occasions when an engine s not begin firing normally after the *t few attempts* following preheating, icates lessening signs, and finally does fire at all, check for ice across the rk plug electrodes. Extra precaution occur very quickly. Extra precaution inst non-starting and external fire uld be taken when an engine does not rt immediately. It can be overprimed. On some installations engine priming is ected by setting the mixture control in le cut-off" position and using the ac- erating pump by throttle-pumping to ce fuel into combustion chambers and fuser section of a radial engine. This is simple priming method, but when the xture control has been returned to "full n" position, and while engine is being rter-turned—or has started under its own wer—do not again pump the throttle. In pumping first mentioned, fuel is dis- buted to the proper location; however, the second case, fuel is atomized at the buretor, and due to the lack of suction the slow moving engine, considerable oline drains to the air intake chute and ks from the chute drain. This dripping l is ignited if a backfire occurs. This e of fire is more frequent in cold ather due to difficulty in estimating the per prime, less efficient vaporization of l, and unequal priming of cylinders. ficulty has been experienced on engines ipped only with the accelerating pump e of primer as the engine cannot be mer "goosed" after it has started. Many ts have added an auxiliary primer.

On many planes fires may occur within carburetor air duct and cannot be n externally. The carburetor air tem- ature gauge may be used as a tell-tale the needle soon hits the top peg dur- such fires and frequently destroys the perature unit if they are permitted to tinue. Open throttle and turn engine h starter to assist in extinguishing fire. helper with a fire extinguisher can be ful if he maintains a sharp watch for buretor scoop fires and acts quickly inst ground fires below the aircraft.

Operational hazards increase with low- ng outside temperatures. At tempera- es below—40° F. standard practices may reversed. Let us assume the engines e been preheated, hot oil has been ced in the tank, engine covers have en removed, and engines started. When few minutes are consumed, either in ing on passengers or standing by for e-off clearance, the oil has been chilled n though the engines have been idling, even turning up 1,000 rpm. Hot oil was mped from the tank while idling, and engine system acted as a heat dissi- er. Experienced cold weather pilots ow that when it is necessary for a re- tly landed aircraft to stay on the line a few minutes the oil will stay hotter the engines are shut off and covered. ormation from the control tower be- e leaving the line may prevent a detri-

"I'd like to talk to you 'bout that landing you made!"

mental "stand by" just before take-off. The molasses-like consistency of recently heated oil has caused engine failures during take-off when engines have been idled for only a short time prior to take-off. Remember: A misleading condition may occur if the pilot assumes the in-going oil temperature will increase during take-off. At very low temperatures it may decrease (as the pre-heated oil is drawn by the pump from the tank) until the oil assumes its average temperature at climbing or cruising power.

Fuel Flow Restriction

Partially filled fuel tanks sweat on the top and upper sides internally, thereby forming a considerable amount of condensation during periods of standing when the temperature of the tanks falls below the dew point of the air within the tanks. This condition results in waterdrops in above-freezing conditions, and hoarfrost in low temperatures. As gasoline sloshing occurs, ice particles may restrict or stop the flow of fuel to the carburetor. A greater hazard appears evident in aircraft where the fuel tank is subjected to some engine heat (e. g., Piper J3). In such cases, water may enter the fuel system in excess of capacity of the sediment trap after considerable engine operation when it was not possible to drain water in the preflight servicing. After preheating it is well to check gascolator drain, as water may have been formed by condensation during preheating. Whenever possible *keep all fuel tanks filled!*

Any water in the fuel system is dangerous when the flight is from temperature areas above freezing to areas of low temperatures, due to expansion as water freezes in the trap. This ice may entirely restrict gasoline flow, or damage the system to the extent of causing a fuel leak.

Obviously little water may enter the fuel tank during refueling when temperatures are well below freezing; however, filtering should not be discontinued because of ice crystals and the possibility of other foreign matter.

Note: The old reliable chamois or felt filter on a funnel is still being used, especially in outlying regions where airport facilities are not available. Many operators prefer the felt filter over the fine filtering qualities of chamois skin, due to faster flow through felt. For best results with chamois, secure chamois skin on funnel with inside of skin (rough surface) on top-side, as the skin pores of the convexed outside of skin are held open rather than pinched, resulting in a more rapid flow. The rough surface (inside of skin) being uppermost tends to retard the clogging of pores from any fine powdered precipitate which is frequently present in fuel. Wash a new chamois with soap and rinse thoroughly before using; as a gasoline-water separator it must be dry. Bond all metallic units used during refueling. (Connect funnel wire to aircraft before placing funnel in tank-filler neck.) It is also safe practice to have the bulged pocket of chamois in funnel in contact with a bonding, such as cross wires, to prevent an unequal electrical potential being created by the wetting of chamois skin with gasoline. Otherwise, until the entire skin is wet and becomes conductive, the actual filter will be at a different potential. Bonding is necessary to prevent a static discharge. Think of "bonding" rather than "grounding" where refueling is concerned. Fires caused by static discharge occur during cold weather as well as warm weather. Naturally, the

(Continued on page 54)

Cold Weather Flying

(Continued from page 53)

danger from this type of fire during cold weather is less because of less gas fumes.

Skis

Ski installations and types have for many years been a subject of much controversy. The rigged angle of incidence, the fore-and-aft location of pedestal, the type of mount and rigging, ski flex versus rigidity, surface loading per square foot, aspect ratio, sliding surface, length, depth, and location of skag or keel, and rocker surface, runner strips, shock struts, etc.—all have been discussed pro and con, constructed and experimented with in many designs. There is no ideal standard ski. A ski designed for a given model aircraft must be compromised according to its subjected service and the nature of landing surfaces. A ski ideally designed for glare ice landings would be at least dangerous if not unusable when operated in deep snow. The subject is too lengthy to discuss here. It is well for the novice to consult the experienced ski pilots as there are tricks to be learned.

Parking in cold weather necessitates ski slicking by taxiing, or scraping of frozen snow before a start may be made. Frequently it is impossible for one man to move the plane, even after a momentary stop. When ski planes have been left parked on the snow, it is frequently necessary to dig a series of tunnels athwartship of skis (leaving enough snow to support plane's weight) in order to scrape the bottom. To increase the ski slick, thereby foreshortening the take-off run, it has been found helpful to rub kerosene on the ski bottoms. Taxiing over kerosene-soaked rags retards surface stickiness and allows much faster take-offs. In comparatively loose snow the frost and snow frozen to ski bottoms may be removed by see-sawing a rope underneath the ski from front to rear.

Landing gear fittings have been damaged by fishtailing when tail ski is clear of surface and main skis are frozen to the surface. Remember: Skis impose higher stresses on landing gears than wheels.

Because of changes in ski surface friction caused by temperature changes, take-off conditions may change tremendously in an hour or more. Sticky snow is very deceiving. When water begins to form with the air above 32° F. the surface is much slicker.

Many inexperienced ski pilots favor rigging skis with only a small angle of incidence to minimize drag in flight. This appears unimportant when normal tail-down landings are made in good light and familiar conditions; however, when a pilot is compelled to "feel" for the surface, using power under conditions of broad expanse of snow and no shadows, he will be thankful for an appreciable amount of incidence to prevent stubbing his toe.

On some shock-cord installations the incidence tension, or shock cord, has been secured to the same upper and lower fittings as the safety line. It's safer to install shock cord and safety line as entirely separate units.

Parked planes, wherever possible, should be left with skis resting on poles or boards to lessen snow adhering to the bottom.

"Can't you sing anything but 'Seated One Day at the Organ'?"

Brakes

Pilots should be wary in taking off from snow-slushed runways, as brakes may freeze in flight, causing locked wheels when landing. A more obscure brake locking, however, may occur during sub-zero temperatures. Hoarfrost may form or blown snow may lodge inside the brake assembly when aircraft are parked in the open. Hard use of brakes generates heat, and the water thus formed may freeze between lining and drum, or in the actuating mechanism. When water is believed to have formed in this manner, it is well to continue taxiing, meanwhile working the brake action without causing friction drag, until the brake assembly has again cooled below the freezing point. When possible, avoid use of brakes during taxiing and take-off. On some aircraft equipped with wheel-snubbing brakes when landing gear is in retracted position, it is well not to retract wheels to the point of spin-breaking when brakes have been used during take-off (*i.e.*, permit wheels to spin). Special attention should be given ice-forming locations on aircraft which have been brought into a warmed hangar from the outside cold and then taken again to sub-freezing temperatures.

Frequently brakes can be applied when hydraulic fluid of too low a viscosity index is in the system; however, when the operating pressure is released, the brake may remain in the "on" position. Although this occurrence may not cause a dragging or locked brake, the brake is temporarily out of service due to one's inability to use a depressed brake pedal.

Caution: During low temperatures always use the proper grade of hydraulic fluid. Never leave parking brakes locked.

Using improper hydraulic fluid in landing gear shock struts during very cold weather has caused accidents, due to the unequal functioning of the shock struts while landing. Shock struts should be at their utmost efficiency on ski planes as the absence of tires places additional stresses on landing gear assembly.

Danger of Frost and Frozen Snow

Most pilots are aware of the danger of taking off, or attempting to, with frost or frozen snow on wings, propeller, stabilizing and control surfaces, or the fuselage. Some pilots have taken chances because of the difficulty of removing snow or frost or have allowed themselves to be "high-pressured" by impatient passengers. Even if the frost layer conforms substantially to the airfoil, the airplane will fly abnormally. Although some airfoils are more susceptible than others and frost formations differ, even 1/16-inch of frost can prevent a normal take-off.

At temperatures between 0° F. and 32° F., frost or frozen snow has been removed in the following manner when wing covers have not been used: Throw a rope over the wing. With a person at each end, the rope is seesawed back and forth. Meanwhile, slowly progress along the wing. The fuselage and tail surfaces can be treated in a like manner. It is more difficult to remove frost this way during excessively low temperatures. A dull scraper such as a putty knife is used to scrape the frost from landing edges and as far rearwards as one can reach. Frost must also be scraped

entirely from the ailerons. Bush pilots have been able to return to base using the above method. But remember—is the trip necessary? Scheduled air carriers often ground their aircraft only because of excessively low temp and frost formation.

Propellers must be absolutely free of frost or frozen snow. Caution: On slinger ring installations check the de-icing fluid discharge nozzles for icing, especially after fire-potting. *One* frozen nozzle can be more serious than both or all nozzles frozen if ice remains on one blade. These nozzles may be preflight-checked by turning on operating valve and manually turning propeller, meanwhile checking for the presence of fluid on each blade.

Cold Weather Use of Carburetor Heat

It is well known that power decreases with an increase of applied carburetor heat, *consistent with good mixture distribution.* However, when operating in low temperatures (below 20° F.) without carburetor heat, the mixture may not be properly distributed. Some carburetor heat increases power output due to better fuel vaporization. Experiment with many settings of heat control for best power.

Keep in mind, when using mixture control at altitude, that any movement of carburetor heat control requires a readjustment of mixture control. An increase of temperature in the carburetor air stream alters the mixture ratio, making it richer by the increased restrictions to flow when a considerable portion, if not all, of the carburetor air passes through the heating muffs, additional ducts, and valve. The direct cold air "ram" is also lessened or lost when a considerable amount of carburetor heat is used.

Oil Pressure Gauges

Beware of false reading indications. When starting engines which have not been fire-potted, oil-diluted or preheated, the oil pressure gauge frequently does not indicate pressure at first, but gradually moves to the required indication or beyond. If the engine is shut off at this period, under certain conditions the gauge will remain at a normal indication and may not return to zero even after long standing. This apparent pressure reading can occur, as the bearing surfaces are receiving little or no lubrication. The condition may be checked by momentarily reducing throttle setting from warm-up speed to idling speed, meanwhile noting if a proper ratio drop in pressure indication occurs. If there is no indicated pressure change, congealed oil is present. It may be further checked on aircraft equipped with two-position, constant-speed, or hydromatic propellers by changing the propeller controls. Naturally, the pitch setting on two-position or standard constant speed will not change from a higher to a lower setting, and on full hydromatic will not change in either direction when temperature is sufficiently low to render viscosity too high. However, if the pitch does change when checked, it is a fairly safe indication the engine has oil pressure. This false reading is more likely to occur in directly connected gauges than in those where the line employs a lighter medium than lubricating oil. Many operators overcome this by installing gauges on the nacelle.

Temperature Gauges

Oil temperature gauges are more dependable than pressure gauges during warm-up. When preheated oil is in the tank, the oil temperature gauge should indicate a temperature rise soon after the engine has started, indicating pump-ability. Starting with cold oil, especially on planes without hopper tanks, the oil temperature gauge (engine in-going) will not register a change for a considerable period. Take note of the rate of indicated temperature rise during warm-up, considering the temperature of the oil at starting. Lack of temperature change or a rapid rise indication should be checked. On some installations an overheating engine will record rising temperatures on oil temperature gauges as heat is conducted from the engine, even though the oil is not circulating. Note the reading of head temperature gauge with oil temperature.

Maintain considerable power while *letting down* during sub-zero temperatures to prevent too rapid cooling of cylinder heads. The engine may not "take" throttle, after idling for only a short period. Likewise, do not attempt take-off until the cylinder-head temperature as well as oil temperature is at least at minimum specified temperature. Many engines have quit during take-offs because of carelessness.

There appears to be some misunderstanding about operating aircraft equipped with an oil cooler with automatic regulator and oil cooler shutters. The tendency may be to operate with shutters wide open, knowing that the regulating valve will not permit the oil to go below operating temperature. It appears better practice to adjust shutter to obtain the reverse tendency, *i.e.,* to close or partially close shutters so the regulator will permit some warm oil to circulate through the cooler; thus the cooler will be available if needed.

Oil Dilution

Most Army surplus aircraft now used commercially are equipped with hopper oil tanks and oil dilution systems. The operator should be familiar with the Army technical orders concerning his particular equipment. In using the oil dilution system the first time after engine has had considerable service, keep in mind that blending gasoline with oil sometimes loosens carbon in the oil lines. Carbon particles in some instances have often entirely closed the oil screen. Caution: Check screen frequently, especially after the first few dilutions. Further note that the level of oil in the tank goes up after dilution; use caution in diluting when the tank has been filled with oil to its highest proper level. During warm-up after oil dilution, gasoline soon evaporates; however, a highly volatile inflammable gas is escaping from breather.

Overdiluting can damage an engine. In estimating the amount of gasoline to be used, the observance of oil pressure-drop method during dilution appears preferable to the strictly timed period, due to the possibility of a great quantity variation of gasoline entering the oil system with different installations and conditions.

Some pilots hesitate to use oil dilution, believing it may have harmful effects on the engine. Others are convinced that no harm is done, and that oil dilution is even beneficial in retarding sludge formation, especially in propeller domes of hydromatic type. Propeller-pitch-changing mechanism may also be diluted by using the prop controls during after part of dilution. Before take-off the diluted oil may be removed from prop dome by changing pitch several times over its full range. Personnel of overhaul depots state that no defects or undue wear is noted during take-down of engines which have been subjected to a great deal of proper dilution.

Radio

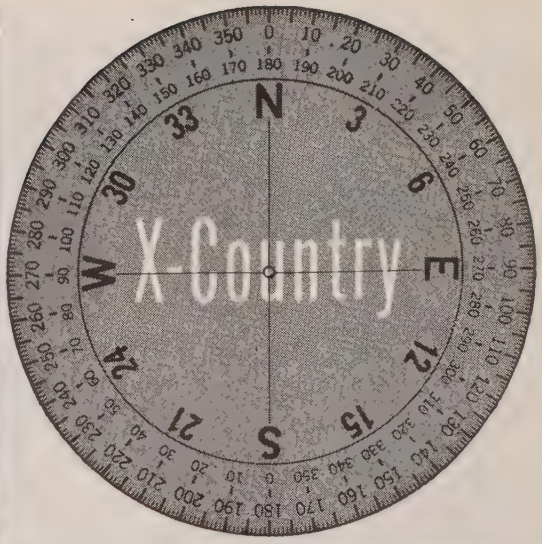
Most radio equipment is designed to operate in temperate climate. Little trouble is experienced at temperatures slightly below freezing. However, below 0° F., radio malfunctioning and complete failures may occur. The following may help:

1. Congealed grease (even of specified type) in control shaft housings or gear cases on remotely controlled equipment has caused seizure, making it impossible to control radio from cockpit. Even though a restriction only is present, the backlash makes it difficult to establish or maintain a frequency setting.
2. When so-called dry cells are used, remember the damp electrolyte in a dry cell can freeze, making the battery useless.
3. Excessively low temperatures change capacitance, inductance, and resistance of circuits. Re-peaking of transmitters and re-balancing of receivers may be necessary.
4. Equipment may fail when brought into a warmed shop for adjustment or repair and subsequently reinstalled in aircraft before the sweating in the warm room has entirely dried. Many shield cans may be removed, but there are other housings (such as inductances) which breathe. Continue slow drying after visible moisture has gone from chassis external units. This sweating may occur in aircraft due to sudden weather changes. Equipment located near a cockpit or cabin heater outlet is more apt to sweat.
5. Rubber, leather, canvas, steel, and glass are all more brittle at low temperatures. More antennae are carried away during cold weather than during warm.
6. Motor generators require more frequent inspection. Brush wear is greater as carbon is more powdery. Carbon granules from brushes may lodge between segments of commutator, causing arcing.

Miscellaneous—but Important!

1. If possible paint the ship brilliant and contrasting colors. It can mean being found as against not being found.
2. Always file a Flight Plan, or tell someone of your proposed course.
3. Carry emergency equipment, and don't hesitate to consult experienced cold-weather pilots, and act on their advice in this regard, as to both the amount and the type of that equipment, even if it may cost payload or range, or both.

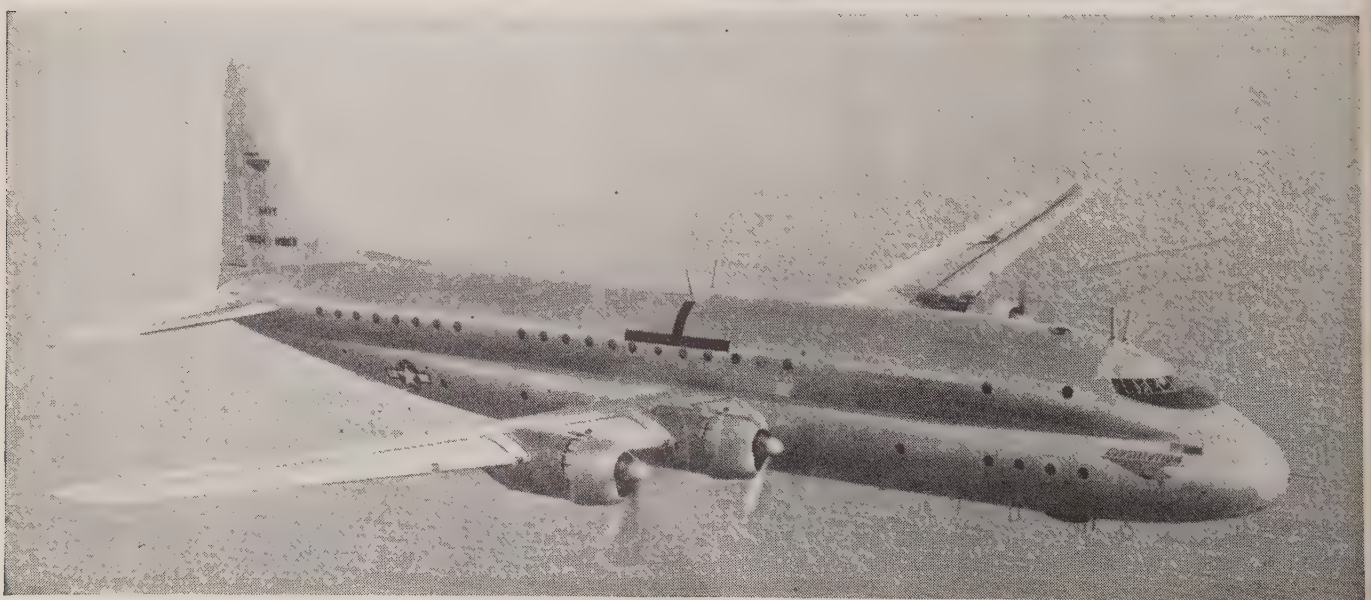
The above article, originally titled "Cold Weather Safety", was prepared by Safety Bureau of the Civil Aeronautics Board, and has been reprinted by permission of Bureau of Safety Investigation CAB.



FAIREY JUNIOR, a new British single-seater plane might well be called the "motorcyle of the air." The tiny ship weighs just 430 pounds, lighter than the average British motor bike. It carries 11 gallons of gasoline and has a fuel consumption of 35 miles per gallon, enough to fly from London to Paris at its 66-mph cruising speed.

DDT-SPRAYING by helicopter is certainly no longer new, but this is one of the best photos we've seen of that kind of operation. This helicopter, a Bell, is shown here fogging a woodland area near Old Forge, N. Y., in an effort to ride that section of Adirondack black flies. Fog used was DDT-laden aerosal, was 100 per cent effective.

NAVY'S CONSTITUTION is a giant 92-ton transport. This photo is one of the latest flight pictures made of the ship. Top deck of the *Constitution* is fitted with 92 airliner-type seats; lower deck has 76 seats. Powered by four Pratt & Whitney *Wasp Major* engines, each developing 3500-hp, the ship has non-stop range of 3,500 miles.



Winged Woodsman

(Continued from page 29)

of the beaver population, protected by Minnesota conservation law, Halvorson appealed to the Fish and Game Department.

"They laughed at us," he said. "Our story seemed unbelievable and highly exaggerated. All the top officials were skeptical. We were licked unless we could show them the proof. And we used our plane to do this."

The State Division of Forestry some years ago had built a one-direction landing strip in the center of the isolated, heavily forested region. Using this strip as headquarters, Halvorson flew the skeptical officials over the entire beaver-damaged area, photographing the timber havoc.

"Our efforts paid off," Halvorson remarked. "The state changed its regulations on trapping, several thousand beaver were subsequently trapped out of that area and the growing damage to extensive stands of valuable trees was halted."

The State's Commissioner of Conservation is as sold on using a plane as is Halvorson. For a long time he had sought an opportunity to inspect the Christmas tree cutting operations deep in the spruce forests near the Canadian border. His busy schedule prevented his making the long trip by automobile, requiring several days of tortuous driving.

"We solved the problem for him with the *Navion*," Halvorson said. "We picked him up early one morning at St. Paul, near his home, and landed him at the Littlefork Wilderness Airport an hour and a half later. There we were quickly transferred to a car, then an army half-track, and, finally a caterpillar tractor for the final leg of the journey into the interior of the spruce bog. Before the day was over, our guest had traveled by airplane, automobile, truck, half-track and tractor, but we had him back home in St. Paul in time for an 8 o'clock speaking engagement that night."

In that forest region where ground travel is slow and often impractical, Halvorson has located from the air thousands of acres of new land suitable for cutting. Recently, he bought 3,000 acres of spruce without setting foot on any part of it.

"We located and rough-mapped it from the air, and didn't inspect it on the ground until after the purchase had been completed," he recalled. "We were very well satisfied with the outcome, for the aerial work was accurate.

"During the war, when trucking operations had to be reduced, we began an intensive aerial survey. We managed to locate enough additional areas for tree cutting to enable us to operate another two years. Up to then, we had believed the timber completely worked over.

"The *Navion* has been, and still is," Halvorson reported, "making it possible for us to do a larger tree business with the same personnel. We can almost be in two places at once now."

The Halvorson *Navion* averages from 12 to 16 and sometimes as many as 24 business flights a month. In addition to those trips, one or two pleasure flights are made. Indeed, for Christmas-tree king Halvorson, an airplane is a valuable and vital piece of standard working equipment. ✣

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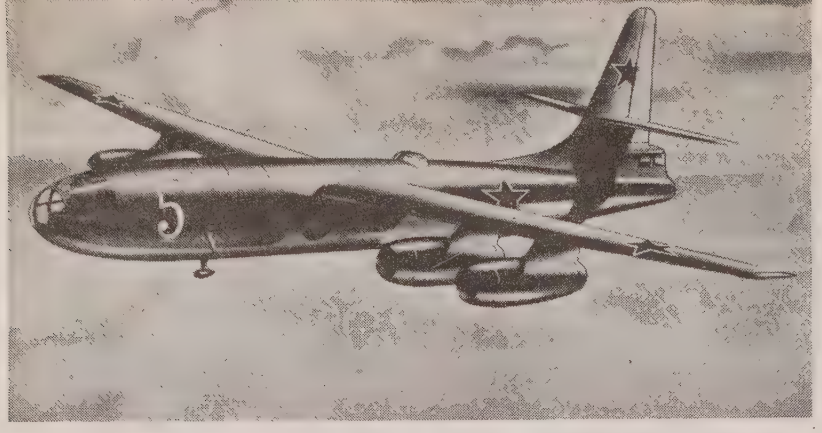
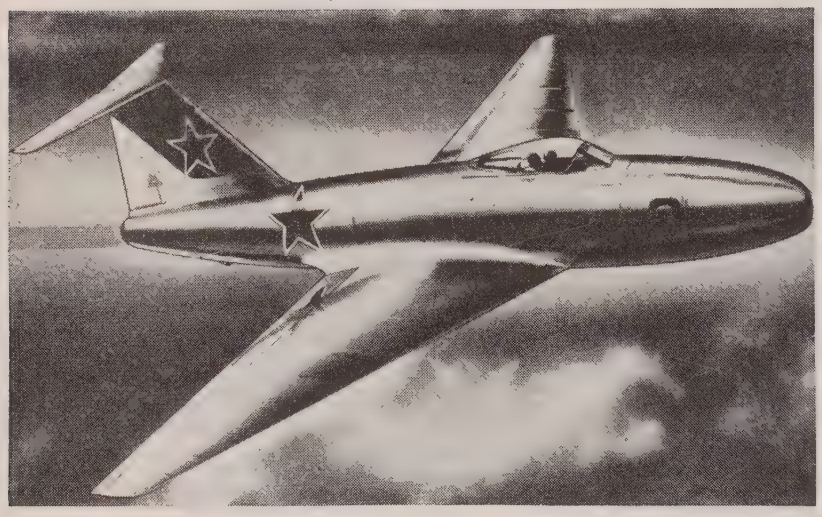


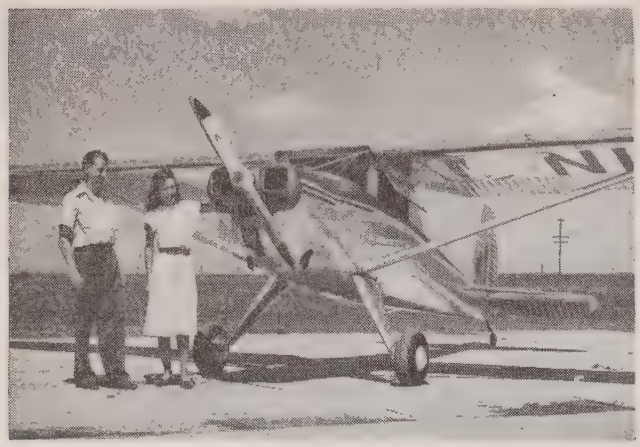
RUSSIA'S development of military jet aircraft is very much of an unknown quantity to everyone but the Russians. The Iron Curtain hides much, but from behind that Curtain recently came information that led to artist's conceptions of new USSR jets. One is the Ilyushin four-jet bomber, said to be one of Russia's most important developments. Some maintain that it resembles the Boeing B-47 *Stratotjet.* However the only resemblance your editor notes is the nose and the suspension of the jet engines from wings of big bomber.

NEW... on the wing



SECOND RUSSIAN jet plane, recently developed by aircraft designers and engineers in the Soviet, is this DFS 346. Authorities claim that it is patterned after an unfinished German DFS 346. There are said to be two versions, both having swept-back fin and swept-back tail surfaces set atop the fin. According to rumors, this plane is strictly a research ship and already has been flown at a speed faster than the speed of sound. One version (*left*) of the DFS-346 has a straight-flow air intake in the nose, while a second version of the DSF-346 is said to have intakes on each side of the fuselage.

SWEDISH-designed and built jet fighter plane is this SAAB-29, a single-seater, single-engine jet having a speed exceeding 100 km/hr. The jet engine used is an English type. Cabin of SAAB-29 is pressurized and the pilot's seat is the ejector type. This Swedish jet ship is still in the process of construction, but its first high-speed test flights are expected to be made within very short time.



LUSCOMBE'S new one is the LU-126, *Sky Pal,* reported to be one of the lowest priced all-metal personal planes ever offered to the flying public. Powered by a 65-hp Continental engine, the *Sky Pal* cruises at 105 mph and has a cruising range of 300 miles and an 800 ft/min rate of climb. Complete with dual controls, this 1949 *Silvaire Sky Pal* sells for $2,095, flyaway factory, Dallas.

Czech Aircraft

(Continued from page 39)

ted to be about seven gallons per hun-d miles.

Another new design is the Praga E-211. is is an extremely modern four-place rist or taxi plane, powered by two lter "minor" engines. It is a pusher-e ship that cruises at 137 mph on its 2 hp.

Quite a variety of lightplanes show up the Czech list of aircraft. There is the n 281 powered by 106-hp Zlin "Toma" gine or the Walter "Minor" engine of same horsepower. The ship seats two e-by-side and offers a cruising speed of 3 mph and a range of 530 miles. It has en called an aerobatic trainer or tourist ne. The Zlin 22 also seats two side-by-e. Powered by 75-hp engine, it cruises 100 mph and has a range of 745 miles. larger four-place version of the Zlin 22 designated Zlin 122. Powered by 106-hp n "Toma" engine, this four-place ship s a cruising speed of 118 mph and a ge of 620 miles.

Another popular Czech airplane is the az "Sokol" (Falcon). Designated the -1C, this cabin air-cruiser seats three d has a cruising speed of 132 mph, a ge of 620 miles. This ship has been dely demonstrated throughout Europe d is probably one of the best known and st liked civil aircraft on the continent. two-place version, designated M-1A, is rainer of similar performance.

A Czech lightplane of old design is the ga E-114 "Air Baby." A two-place ining-type ship, it is powered by either Praga D engine or a Walter "Minor." ising speed with the Praga engine is 2 mph, while with the "Minor" engine cruises at 113 mph. However, range th the "Minor" is 500 miles and only 5 miles with the Praga.

The high-performance contribution to Czech personal or private plane field is sleek Hodek HK 101. When the com-ny was building the first or prototype dek HK 101, it was a privately owned n by virtue of its employing less than people. With the success of the HK 101 d its subsequent production, however, re people had to be added to the pay-l and so the company became a part of National set-up.

The HK 101 is powered by two Walter inor" engines and has a cruising speed of 186 mph. Its top speed is 220 mph . . . on only 212 horsepower. This ship is of all-metal semi-monocoque construction, seats two and has retractable landing gear.

A good indication of the acceptance of Czech aircraft and engines by flyers in other countries is the fact that not only have several Czech planes been sold around the continent but in England, for example, the Miles company introduced the Praga engine in its Gemini.

A half dozen different engines are used extensively in the Czech aircraft projects. Chief among those engines are the Praga, Walter and Argus designs.

The Praga "D" is a four-cylinder horizontally opposed engine with a maximum output of 79 bhp at 2,610 rpm. Using the engine at a cruising horsepower of 60, its fuel consumption is just under .5 lbs. per bhp. This engine is installed in the Praga E-117 two-seat cabin monoplane, the E-114 "Air Baby" and, since the end of the war, has been fitted into many surplus stock Piper *Cubs*, left overs from the USAF. The *Cub* with the Praga "D" has an 87-mph top speed and cruises at about 80 mph.

Praga also makes an "E" air-cooled eight-cylinder horizontally opposed engine. This one has the same bore and stroke as the "D" but it has a slightly greater compression ratio. At 2,650 rpms, it develops 150-hp. Praga makes the 104-hp "Toma 4," too.

The only other large-scale engine manufacturer in Czechoslovakia is the Walters outfit. This company makes the well-known "Minor" engine and the "Mikron." The Walter A engine is a small two-stroke twin-cylinder air-cooled inline engine especially designed as an auxiliary powerplant for sailplanes. It has a sea-level rated horsepower of 22 bhp at 2,400 rpm.

The Walter "Mikron 111" is a four-cylinder in-line inverted air-cooled engine designed for trainers or light sportsplanes. It has a rated horsepower at sea level of 65 bhp at 2600 rpm.

The Walter "Minor" series of engines also are four-cylinder in-line engines. The "Minor 4-111" can be fitted with a supercharger to give improved take-off and climb performance. Running on 87 octane fuel, it develops 105 hp at full throttle. This is the engine that powers the Sokol, the Praga 210, a modern five-place twin-engine-pusher-type aircraft, the Aero 45, a four-placer, and the Hodek HK-101.

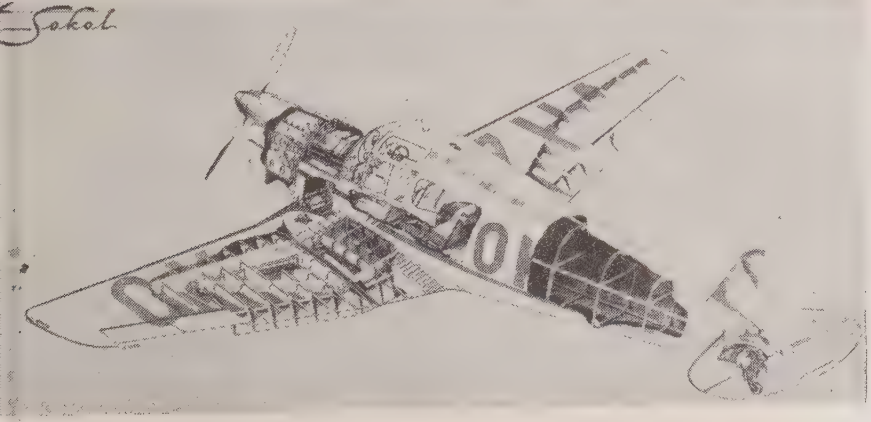
In effect, the "Minor-6" is a six-cylinder version of the "Minor-4" engine. For take-off, the six-cylinder "Minor" reached 180 hp for three minutes with full supercharger rating, but its normal limit is 120 hp. Two of these "Minor-6's" power the new Avia 38A, a five-place commercial air operation plane that cruises at a nice 195 mph.

The Argus AS-410 engine is a good German-type engine that is widely used by the Czechs. It powers the Letov 101, a 12-place transport; the C-2, an advanced military trainer; and the C-103 which is an eight-place feeder transport. This engine achieves a maximum of 465 hp. The Czechs have continued this engine in full production and are using it in many projects.

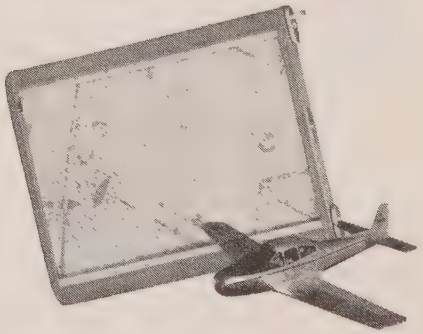
The Czechs are, of course, deeply interested in experimenting with jet engines . . . and, undoubtedly, much is being done along this line. The German Jumo 004 jet engine is used in the Me-262, and the Czechs are buying Bristol "Theseus" units for the Letov L-103 airliner.

Considering all things, the Czech aircraft industry is showing itself to be entirely healthy, and an industry that has made extremely rapid recovery from its German-dominated doldrums of World War II.

RAY drawing of the Mraz Sokol, designated M-1C, shows details of its construction



Navigation Is Easy . . .



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30 Minutes in a Jet

(Continued from page 32)

battery. A three-foot push-pull rod lifts the Plexiglas covering high enough so the instructor and student pilot can climb into the cockpits fairly easily. The push-pull rod also contains an explosive charge which will jettison the canopy in flight should the pilots have to bail out. When the canopy blows off the plane, the two occupants pull up on the handles of their seats and another explosive charge shoots them out of the ships. The TF-80C is *really* loaded!

Visibility, even from the back pit of the two-place F-80, is surprisingly good. In taxiing it surpasses a BT and is much superior to an AT-6. The big Allison jet (J33-A-23) idles at a mere 4,000 rpm as you roll smoothly down the taxiway. All steering must be done with the brakes since there is no slipstream and the rudder is ineffective under 80 mph.

There's no warm-up to these jets. You have no props to check, no manifold pressure and no mags. Just make sure that fuel is flowing from both tanks, swing down the runway and open the throttle. A special metering arrangement on this plane makes it possible to jam the throttle right to the stops and the Allison will accelerate only as fast as is safe for the engine. A 50-50 mixture of alcohol and water is available for fast take-offs.

"You handle the controls," said "Fish," as we turned into take-off position, "and I'll work the gear and flaps."

There's no torque as you pick up speed down the runway. After watching Cleveland-bound F-80's is the Bendix race stagger off this same runway, we were surprised that the two-place model, minus tip tanks, hopped off the ground within the first half of the 6,500-foot runway.

The trim tab is an ingenious little gadget on the top of the control stick. It is not over an inch long and a quarter-inch high and you control it with your right thumb. Forward on the trim tab control activates an electric motor in the tail that changes the angle of the tab.

From a pilot's standpoint, the F-80 handles with remarkable ease. It's responsive on the controls and quiet—all the noise goes out the back. As we climbed up out of the smog, "The Fish" pointed out a formation of National Guard P-51's and remarked, "If you want to see how fast this thing really goes, make a pass."

We banked up into what we thought was a level turn—and gained 2,000 feet! Even at the slow speed of 300 mph it takes almost the whole San Fernando Valley to make a 180° turn and all that time your wings are almost vertical. We finally got lined up behind the fighters and came in toward them in a shallow dive.

"You'd better start turning back here," rattled the inter-com. "You'll be on top of them before you realize it."

We were! We rolled the F-80 over into a turn and we passed the P-51's as though they were parked at the curb. They fell away behind us much the same as a DC-4 passes a *Cub*. No wonder the National Guard pilots are crying for jets.

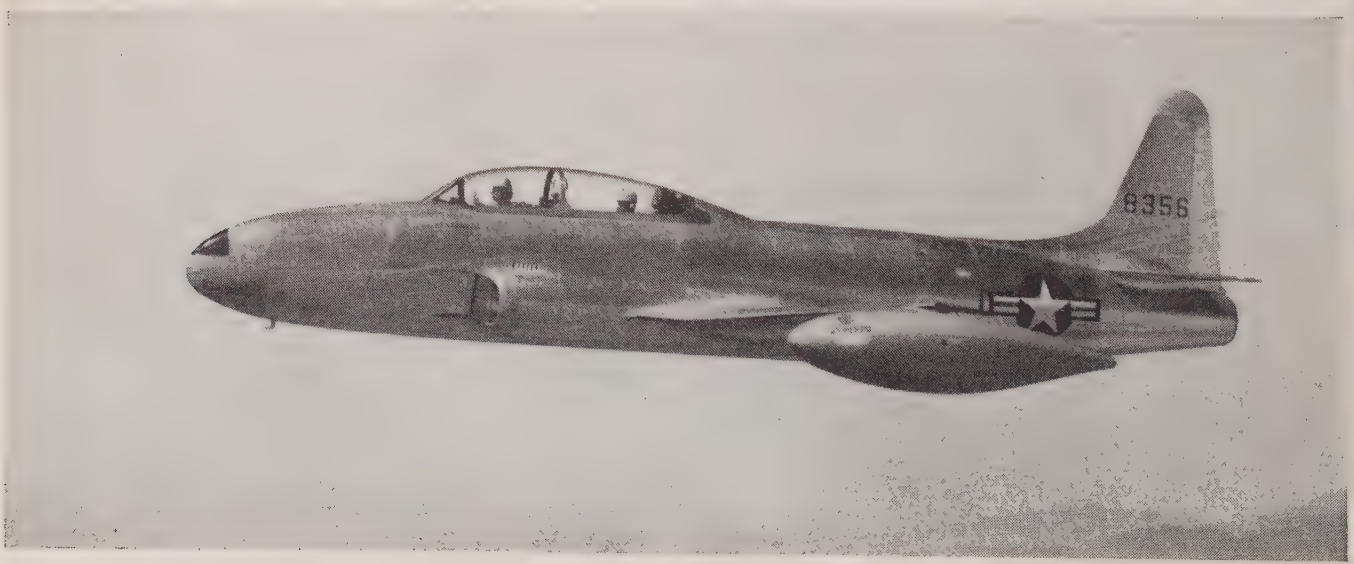
"Take it up to 10,000 feet and try some stalls and turns," said our check pilot.

Small flecks of ice came out of the air conditioning unit in the sealed cabin as we pulled up on the nose of the F-80 Air friction at high speeds would roast occupants to a deep brown were it not for this automatic cooler that keeps inside temperatures at an even 70 degrees. An expansion turbine cools compressed air from the engine, and it is further chilled in the inter-cooler fed with outside air. The refrigerated air is blown into the cockpit from six vents at a rate of 21 lbs./min.

The flight upstairs was exactly like a little kid's dream of riding a skyrocket. The valley floor literally seemed to fall

TEST PILOT Fish Salmon goes over details of flight in the F-80 with the author just before take-off from Van Nuys Airport. The ship's jet engine idles at mere 4,000 rpm

TWO-PLACE F-80 is said by many pilots to be aerodynamically cleaner than the single-place F-80. Rudder is ineffective under 80 mph



y behind us. We tried to anticipate 10,000-foot level, but we were at 12,- before we finally got the ship trim- out.

Ve throttled back on the jet and the) quieted out just like a glider. There no noise but the silky swish of the air ing by the canopy as the plane began low down. With the gear and flaps up, F-80 stalled at about 120 mph indi- d, but there was plenty of warning re the plane quit flying. The stick k and shuddered like a Stearman long re the stall arrived and the slightest ard pressure put the F-80 right back g again.

These things will handle power off just a glider," explained the Lockheed test t. "Their glide ratio is better than 15- at an indicated 175 mph. A pilot was ing one of these up from Panama and out of fuel over 100 miles off shore 5,000 feet. He made it in to the air- with 10,000 feet to spare."

Ve asked if it was OK to roll around t in the F-80 and "The Fish" nodded gold helmet.

You won't need to use any rudder in r slow rolls," advised the test pilot. t ease in full aileron and watch her

Ve tried a slow roll and instinctively d in top rudder coming around off our . The nose skidded off to one side.

Now try it with your feet on the floor," Salmon.

worked, too! The F-80 does the neat- ileron roll with nothing but side pres- on the stick. There is a hydraulic ster system to all controls so that the t doesn't fight the air pressure alone. ith the rear seat clear at the top, our h helmet thumped on the canopy each e the ship rolled, even though our ty belt was snug, but the ship went nd so smoothly that we didn't mind.

Now I'll show you the high-speed onstration," said "The Fish" as he ed the top of his helmet to signify he the controls.

Ve nosed over slowly from 10,000 feet headed back toward the Van Nuys ort. When we finally got squared away he seat, the airspeed was at 300 and g up fast. The large hand on the alti- er was unwinding frantically — 350 . . . . . 450 . . . 500 . . . and the valley literally leaped up to meet us.

t 525 mph Salmon started to level off we flicked across the field at 2,500 indicating almost 550. Because of hot day and the above-sea-level alti- , that pass calibrated out at an actual mph—10 miles per minute.

hen came what this reporter felt was biggest thrill of the flight. Salmon d back on the stick and we started up up . . . and up. The "G" meter un- nd to 8 and we started to black out. her of us were wearing G suits. The tweight crash helmet felt like a huge k of dictionaries and the bright blue he sky turned dark blue, purple and st black. Our 150 pounds were equal 1200. As the pull-out turned into a ght climb, we tugged our head out n between our shoulder blades and ed back over our shoulder. The val- was falling away like gravity in re- e. We climbed from 2500 to 11,000 feet in less than 25 seconds—that's about 24,000 feet per minute. Then on the top of the pull-up, we did two rolls to slow down!

On our way home, "The Fish" demonstrated the effective dive brakes, two little flaps under the fuselage that measure a foot by a foot and a half that open into the air under hydraulic pressure. We only dived to 500 mph, throttled back on the jet and dropped the flaps. Had it not been for the shoulder straps, we would have massaged the instrument panel with our crash helmet, the decelleration was so rapid. The ship quivered and shuddered as the air speed dropped—fast.

We finally slowed down enough, 215 mph, to drop the landing gear, and crawled into the traffic pattern. The approach was high and wide for a puddle-jumper, but the F-80 settled smoothly as the flaps dropped. We had 150 mph as we turned on the final approach and then slowed up some more.

As the air speed dropped to 125, "The Fish" rocked on the stick.

"See what swell aileron control there is at slow speeds," he chortled. "You can slip it, too."

The F-80 skated out sideways, just like a *Cub* on a high approach. Salmon kicked the F-80 back straight and lined up with the runway. We crossed the fence at 115 and Salmon held the F-80 in the air until it was completely stalled out—just under 100 mph. And he started using his brakes just as soon as the nose wheel touched the ground.

When we climbed out of the rear pit, we felt like the end of a bad four rounds with Joe Louis . . . a bit punchy but trying not to show it. The hop was a 30 minutes we'll never forget.

First production F-80C's will go to Williams Field, Arizona, where Air Force cadets will fly them after only 170 hours in the T-6's (the old AT-6).

The F-80's primary function is advanced single-engine jet transition instruction, eliminating the time now given in propeller-driven fighters. It will also be used for air-to-air and air-to-ground gunnery instruction, high-speed navigation training and photo reconnaissance work.

Two 50-caliber machine guns in the nose can be fired by the student after the instructor releases the firing mechanism. Four more guns can be installed to give it the fire power of a fighter.

A 1000-pound bomb can be carried on each wing tip or additional fuel tanks can be added on the wing tips.

Long the wish of seasoned flight instructors, a movable "lockout box" can over-ride certain vital controls in the student's cockpit. The instructor can switch off all the student's electrical controls leading to the wing flaps, dive brakes, aileron and elevator tabs.

Many pilots swear that the elongated two-seater is aerodynamically cleaner than the stock F-80 and therefore is actually a faster plane. Addition of an afterburner could well make the TF-80C one of the world's hottest tactical aircraft.

For a quick comedown from the thrills of near-sonic speed, this reporter was stopped by a traffic cop on his way home from the Van Nuys Airport. He'd been doing 50 mph in a 40-mile zone!

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Dilbert

(Continued from page 41)

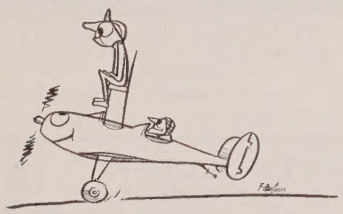
Copilots should be indoctrinated to *repeat all orders,* both verbally and by hand, before execution. That way signals are harder to misinterpret. Another good safety measure is to have a standing order that the landing gear will never be retracted until an altitude of at least 50 feet has been attained—and make that order impressive and emphatic!

A private word to copilots: Remember, you aren't there just for the ride. You are supposed to help the pilot, not make life more difficult for him. Something so elementary as a premature retraction of wheels should be obvious. Get on the ball! You'll appreciate a wide-awake assistant yourself when you become first pilot.

Front Seat Lookouts—A number of collisions have occurred in training planes because students failed to notify their instructors in the rear seat of the proximity of other aircraft; or warned them too late.

Vision in the rear seat is usually so restricted that it is, of necessity, the responsibility of the front seat pilot to keep a sharp look-out for other aircraft. Here's some advice to instructors on how to handle this matter.

The way to impress your front seat man with the importance of his look-out duties is to yell and scream about them before take-off. Then wait until the first time he fails to report a nearby plane, at which time force yourself to become downright unpleasant. This usually gets the idea across.



In addition to all this, act as your own look-out, just as though you had no one in the front seat.

Duck Soup—While cruising along at approximately 250, a pilot flew through a flock of ducks. This wasn't as funny as it sounds, for several of the ducks struck his airplane, which set up such severe vibration as to require an immediate forced landing. The pilot came out of it with a broken jaw; the airplane was a washout.

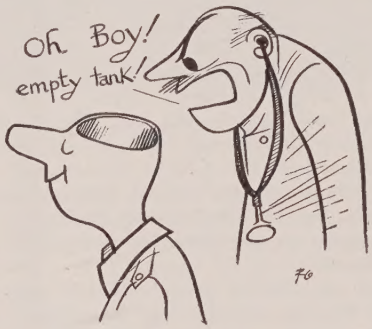
In my opinion, this pilot got off mighty lucky. It used to be fun to chase ducks, but that was back in the days when you had to have an extra fast plane to overtake one. *With modern aircraft,* striking even a small bird at high speed may cause loss of control and result in a serious crash.

I'm not accusing Dilbert of deliberately running into this flock of ducks; I'm merely warning all and sundry to stay well clear of such things, if possible. My Dad once told me of a straw being driven through a five-inch oak tree during a tornado. Let it all be a lesson.

" . . . a really dry run!"

A Dry Run—A pilot with over 1,000 hours flying time was practicing landings. After about an hour of this, his engine cut out immediately following take-off, and a serious crash resulted. Investigation showed the entire flight had been made on a wing tank and that the gas in this tank had been exhausted during the last take-off.

Undoubtedly, this Dilbert had no intention of running his tank dry. He just became so interested in his landings that he forgot to keep track of his gas consumption. He didn't remain *fuel conscious.*

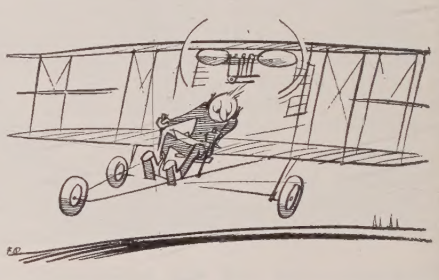


Everybody knows you must intermittently check your fuel consumption and keep the fuel picture in the back of your mind—but not too far back. Also, how dangerous it is to run a tank dry at low altitude; even if you shift tanks immediately, you may not have enough altitude to regain suction.

All of which is just common sense, as are most precautions in aviation. That's why I keep harping that "common sense" is the most necessary and valuable asset an aviator can have.

Keep Up to Date—Dilbert had a very embarrassing forced landing the other day while on XC. He was blithely following a radio range and hadn't bothered to check any land marks, so it wasn't until he was very low on gas that he realized something was wrong. He ran out of gas while trying to orient himself, and wiped out his landing gear and one wing when he came down.

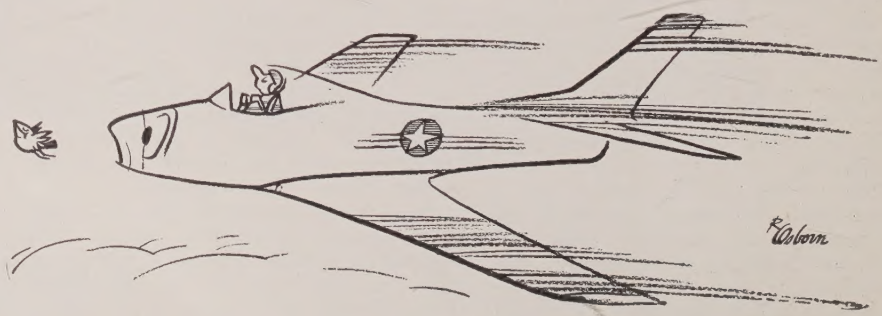
Naturally, this was embarrassing to an experienced pilot like Dilbert, but he looked even more ridiculous when it developed that he was using an out-of-date chart, which did not show the re-alignment of this radio range. He landed 50 miles north of where he thought he was. *Moral: Be sure your charts are corrected to date.*



Weekly Notices to Airmen and NOTAMS are two other publications that no cross-country pilot can afford to ignore. They are published by the Government exclusively for *you,* to make your flying

safer and more enjoyable. Perhaps the field you are heading for is closed for repairs; perhaps it has been turned into a fertilizer factory since you last were there; perhaps a dozen other things.

A good pilot often is able to get out of a tight spot. But the best pilot is the one who keeps out of tight spots—by foresight, planning and checking.



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(Continued from page 63)

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Operational Engineering

(Continued from page 44)

of the oil cooler, protection of Zone 3 and protection particularly of the anti-icing heaters and surrounding space in what is designated as zone 3a on the 202. The Zone-3 system includes actually discharging carbon dioxide into the intakes of the heaters and also to the entire surrounding compartment. The third main 202 line runs into the forward fuselage and opens into the cabin heater and compartment housing.

In case of a second fire, independent of the first, or re-ignition of the first fire, the pilot actuates the switch for the reserve bank of three cylinders and these are operated in exactly the same manner as the main bank up to the double checked tee where the discharge enters the common system line.

The 202 includes a separate one-shot protective system for the two belly baggage compartments which consists of a 147-cubic inch steel cylinder holding 3.62 lbs. of carbon dioxide. This is controlled by an electrically operated flood valve, operating like the main system flood valves, and includes one stop valve for each compartment.

For safety control in the main system, one discharge indicator provides a means of determining whether the carbon-dioxide supply has discharged when the system is operated. Two other outboard discharge indicators mounted in the skin of the airplane are connected to cylinder safety outlet lines, one for each bank. If excessive temperatures (climatic or other) result in a pressure build-up to approximately three times normal stored pressure, the gas ruptures a safety disk in the cylinder valve and discharges harmlessly overboard, shattering a frangible disk in he discharge indicator, thereby indicating that one or more cylinders in the bank have been discharged. One temperature discharge indicator is also installed in the separate baggage compartment system.

In addition to built-in equipment, commercial airliners are required to carry portable hand extinguishers for possible open cabin fires.

Fire-detection systems, integral parts of any complete fire-protection network, operate on several different principles depending on the installation site. Engine and heater compartment detectors, mounted in sectors where flash fires are apt to occur from flammable fluids, are usually of the heat- or flame-detector type, while instruments installed in baggage and cargo compartments where fires are more apt to be the slow burning carbonaceous type, are usually photo-electric smoke detectors.

Although emphasis here has been on a commercial system, Kidde has designed and manufactured a packaged carbon-dioxide fire-extinguishing system for installation in the engine compartment of single-engine aircraft and also designs and builds CO_2 and methyl bromide systems for all the latest types of military aircraft, including many of the multi-engined U. S. jets. The working elements of such systems are essentially the same. J. LEICHTER.